N. S. Vol. XVI. No. 3. May, 1909.

The Psychological Review.

THE INFLUENCE OF CHARLES DARWIN UPON HISTORICAL AND POLITICAL THOUGHT.

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The preliminary work which needed to be done before people could apply Darwinian methods in history was not so great as the corresponding work which had to be done in biology. When Darwin presented the doctrine of evolution by natural selection to the zoölogists and botanists, he had to deal with men who for the most part did not believe in evolution of any kind. They had been brought up to regard different species as having an independent existence. The idea of development of types by slow processes of change was something new and foreign to their minds. In history or in politics the case was different. These sciences are based on a fundamental assumption of an evolutionary doctrine. If different historical events were independent of one another there would be no sense in writing history at all. All serious investigators in this field, from Thucydides and Aristotle down to the present time, have sought either to develop the details of this orderly and gradual evolution or to lay down the principles of its operation. The man who to-day reads the Politics of Aristotle for the first time will be struck by the prevalence of methods of thought which many biologists suppose Darwin to have invented. And the same idea of evolution thus used by Aristotle has been applied in varying forms by all who sought to develop a philosophy of history —by Hegel and his followers in Germany or by men of the type of Henry Thomas Buckle in England.

Not only was the idea of evolution thus familiar to the historians; the idea of natural selection was also prominent in the

minds of many of them. The whole doctrine of John Stuart Mill concerning liberty was founded upon reliance on a process of natural selection. Look for your hero in all possible directions, he said, and you get the best chance of finding him. The issue between Mill and Carlyle reminds one of the controversies between Darwinian and anti-Darwinian in the field of biology. Carlyle believed in the special creation of a number of individual heroes; Mill, together with nearly all scientifically trained historians, believed in the evolution of heroes by natural selection.

The conception of economic or political conflict as a means of determining the survival of the fittest was seen perhaps even more conspicuously in Malthus's theory of population — a theory which Darwin himself regarded as having in some respects foreshadowed his own work. Malthus made it a fundamental basis of his doctrine that population tended to outrun subsistence; that the struggle for existence was a constant process of elimination of the weak; and that any attempt to interfere with this process resulted rather in the deterioration than in the improvement of the peoples that it was designed to benefit.

If then the idea of evolution had been a fundamental one in historical and political science for more than two thousand years, and if the idea of elimination by natural selection was by no means unfamiliar to political thinkers, what was there left for Darwin to do in this field?

He found at least two things to do. In the first place, he showed how natural selection was a means of developing, not only individuals of superior ability or intelligence, but types of superior adaptation to their surroundings; and he taught us further to regard this adaptation of the type to its surroundings as the thing which gave it its right to exist.

The first of these points is well illustrated by the history of the Malthusian theory before and after Darwin. Malthus and almost all the Malthusians before the time of Darwin talked of an actual struggle for food between different individuals. They thought that there was not enough food to go round, and that this fact was a direct means of keeping workers up to a certain standard of efficiency and prudence by the direct elimination of

the weak. To-day we see that the result is far more indirect than this. There is, in civilized communities at least, no habitual scarcity of food. This has been avoided by the development of certain institutions like the family and private property and certain motives which go with those institutions which prevent the scarcity that would otherwise exist. A generation ago the critics of Malthus thought that the non-existence of the scarcity disproved the Malthusian theory. To-day we see that it confirms it. It shows that the type has adapted itself to its environment.

It is the institution even more than the man that has been marked out for survival by the process of natural selection. We have known for generations how elimination affected the development of individuals. It was Darwin who taught us to account in this way for the growth of species — in history as well as in biology. And in thus accounting for the origin and growth of institutions, he furnished for the first time an objective justification of the ethical standards and motives by which those institutions were upheld. Every prominent political thinker before Darwin, with the one notable exception of Edmund Burke, referred historical events to some preconceived ethical standard of his own, and judged them to be good or bad according as they conformed to his preconceived ideas. This is true even of a man like John Stuart Mill. He had great natural love of liberty, and was essentially tolerant in his disposition. Yet one can feel in all his work the underlying assumption that the chief reason for approving of liberty is its effect in developing the type of character represented by the liberal and tolerant Englishman of the nineteenth century.

This attitude of mind was a great help to Mill in arranging a coherent system of political economy; and as long as he addressed an audience whose general views and general standards were like his own, it enabled him to appeal to them with great force. But the instant he was brought face to face with a protectionist like Carey or a socialist like Lassalle, what had previously been an element of strength became an element of weakness. There was no common ground from which to reason, and no means of finding any. It was Darwin who furnished the common ground. It was Darwin who gave the judgments

of historians and of political thinkers the possibility of reaching objective results which were previously unattainable. You like one kind of man and one kind of institution; I like another kind of man or another kind of institution. Very well; let us set to work to discover which, in the long run, is going to prevail over the other. That which will prevail in the long run must be right. This is for the historian the center and gist of Darwinism. We all assumed that orderly evolution existed; we most of us understood a good deal about a process of natural selection which was going on. But none of us until Darwin came had learned to take the results of natural selection as a standard; to make the fact of permanence the test of the right to remain; to assume the view of the philosophical pragmatist in dealing with the problems that came before us.

Of course this is a doctrine that needs to be applied with great care. The frank acceptance of survival as a test of right is attended with the great danger that we may take too short periods of history under our observation, and may think that an idea or an institution has won the race when it is riding most hurriedly toward its downfall. But in spite of all these dangers, the necessity of applying the survival test compels the man who is naturally dogmatic to be somewhat less so, and helps the man who is naturally objective to be somewhat more so. It is a restraint upon the man who does not want to have to prove his points; it is an assistance to the man who does.

This change in modes of thought and criteria of ethics did not come suddenly. It was far easier for popular writers to seize upon certain results of Darwin's thinking and try to apply them to history in the form of rhetorical analogies than it was to get at the Darwinian habit of mind in dealing with historical problems in general. Herbert Spencer's writings furnish a very marked instance of this error. Spencer's style was so felicitous and his works were so widely read that he did a good deal to retard the application of the really important results of Darwin's work to political thinking. Spencer and his followers made much of the conception of society as an organism; but they overlooked the fact that historians had been treating society as an organism for more than two thousand years. In the belief

that they had occupied a new field, they permitted themselves to employ a number of loose analogies, in total ignorance of the fact that competent observers had already gone over much of the ground by scientific methods. Historians had been proving which forms of social life *did* survive; and this proof, defective or uncertain as it was in many instances, was yet better than the guesses of the Spencerian, on the basis of remote analogy, as to which forms of social life *were going to* survive. When Spencer pronounced evolution good or bad according as it did or did not 'proceed from an incoherent indefinite homogeneity to a coherent definite heterogeneity,' he was writing down in large letters the fact that he was born a good while before *The Origin of Species* had appeared. He had put on a few of the external attributes of the modern biologist; that was all. The hands were the hands of Esau, but the voice was the voice of Jacob. Or, to take an instance from a different field, when W. K. Clifford, in his now almost forgotten *Lectures and Essays*, proclaimed the right and duty of the unlimited exercise of private judgment, and called down anathemas on the head of every man who wished to exercise his own private judgment to the extent of differing from Mr. W. K. Clifford in this particular, he simply showed that he lived too early to have felt the full effect of *The Origin of Species* in leading people to substitute objective criteria for subjective ones.

But it would perhaps be toward the purpose to give instances of writers who were influenced by Darwin, instead of those who were not.

Among English economists, the man who was quickest to feel the force of the new movement was Walter Bagehot. Bagehot's Darwinian ideas are popularly known from his *Physics and Politics* — an interesting and often exceedingly brilliant set of conjectures regarding the operation of survival in prehistoric periods. But Bagehot's main work and main interest were always in the nearer parts of history, and particularly economic history, rather than the remoter parts. He it was who, in an age when England still followed John Stuart Mill blindly, first questioned the general admissibility of Mill's assumptions. In these twentieth century days, when competition is regarded,

not as an axiom or postulate of political economy, but simply as an important incident in its development, it is difficult for us to understand the courage that was involved forty years ago in publishing two critical essays in which competition was regarded, not as a standard to which all things must conform, but as one among several alternative phases or modes of social service, whose relative claims were to be investigated and relative merits judged by their applicability to given conditions. In this mental attitude the English writer who has followed Bagehot most closely is W. J. Ashley, whose *English Economic History* may be taken as furnishing a clear exemplification of Darwin's influence upon the methods of modern economic thought.

Meantime a German investigator in economics, Adolf Wagner, of Berlin, had been taking up Darwinian methods on a larger scale and applying them with conspicuous success. Wagner may be said to have developed his Darwinism at the opposite end from Bagehot. Bagehot had been brought up in the methods of the deductive school of economics, and was impressed with their inapplicability; Wagner had been accustomed to the methods of the historical school of economics, and was impressed with their inconclusiveness. While Bagehot wanted to make his analysis broad enough to fit different kinds of facts, Wagner was concerned to make his synthesis coherent enough to bring him to some positive proofs and conclusions. Wagner's treatment of the theory of property right is a good example of his philosophical method. He rejects both the crude juristic theory that property right is based upon occupancy and the equally crude philosophic theory that it ought to be based on labor. Society has established property right because it has shown itself the best motive — in fact, apparently the necessary motive — in order to get industry well and efficiently managed. It is only by the application of this last theory that you can make a connection between what is and what ought to be; between your history and economics on the one hand and your law and ethics on the other. If the philosopher says that property ought to be based upon labor, the jurist can laugh at him. If the jurist says that property is based upon occupancy or upon the constitution of society, the philosopher can say that the

occupants are bad men and that the sooner society changes its constitution the better. But if property is an institution which has survived while other forms of social organization have failed, because property preserves nations and socialism destroys them, then socialism is disproved by the logic of events — the logic that Darwin has taught us to apply to problems of this kind.

It is, however, not so much in its special applications that the Darwinian theory has affected modern political science as in the general habit of mind which it has fostered and cultivated. It has not led to many great discoveries which can be set apart from the general run of facts previously known; but it has led to changes in the methods of judgment which enable us to understand and use all historical facts in a more objective way.

A few years ago, when Dr. Jowett was master of Balliol, there was a discussion concerning two men who had attained high position at an early age. One of them had become a bishop, the other a judge; and the conversation turned on the respective merits of the two careers. One of the dons said, "I prefer the bishop. The judge can only say, 'You be hanged'; the bishop can say, 'You be damned.'" "Yes," said Dr. Jowett, sententiously, "but when the judge says 'You be hanged' *you are hanged.*" The influence of Charles Darwin on historical and political thought may be summed up by saying that he has made our historians cease to aspire to be bishops and content themselves with the more modest but also more effective position of judges. For broad principles of judgment which they could not apply effectively they have substituted narrower but clearer ones whose application can be made evident to their fellow men.

I have spoken of this attitude of mind as having been foreshadowed in the works of Edmund Burke. To him, as to the modern thinker, human history was the record of a process of elimination and survival. To him political institutions and political ideas had grown up as a means of preserving the race that held them. And to him also it was unwarrantable to attempt to tear down on *a priori* grounds beliefs and methods that had preserved the race that held them, unless you were able to substitute something practically better in their place. A thing

did not seem to him correct which was logically good and practically bad. He suspected a defect in the logic. Was he right or wrong? In the first half of the nineteenth century the majority of men would have said that he was from a theoretical standpoint wrong. They admired his insight into the political conditions of his day, but they would have none of his theories. To-day the world feels a little less sure about some of his individual judgments than it did at the time when they were uttered; but as a matter of theory it has accepted his method as a sound one. It is in general prepared to make survival a test of right.

This is Darwin's contribution to political science; and the completeness with which this contribution is accepted is shown by the sudden cessation of public interest in books which do not apply or accept that test. Students of politics no longer read either Hegel or Comte. Buckle's *History of Civilization*, which in the years immediately following its appearance had a greater success than Darwin's *Origin of Species*, is now known only to a few specialists in literary history. Mill's *Principles of Political Economy* is valued for its contributions to the theory of banking; but as a work of political philosophy it has lost the place which its author, modest man though he was, confidently claimed for it.

We can get a curious idea of the kind of change which has taken place by comparing two works which are closely akin, by two men who were closely associated — Mill on *Liberty* and Morley on *Compromise*. The two writers deal with nearly the same topic. They approach it with nearly the same prepossessions. They arrive at almost exactly the same practical conclusions. Yet Morley is read to-day, and Mill, speaking broadly, is not. Why? Because Mill is constantly referring things to a subjective standard, and Morley to an objective one. Mill's whole argument is essentially an *argumentum ad hominem*, even when it takes the form of an appeal to experience; Morley's an appeal to experience, even when it takes the form of an *argumentum ad hominem*.

We may not be any more correct in our political reasoning than our fathers. I dare say that when the world contrasts the political philosophy of to-day with that of a generation or two

ago it will reprove us for our crude judgments and for the irreverence with which we have cast aside work that was better than our own because it did not reach its results by our methods. But we are at least trying as no previous generation has tried to get *objective* standards on which different men and different ages can agree; and for this effort, and for whatever measure of success it has attained, we may thank Charles Darwin.

THE INFLUENCE OF DARWIN ON PSYCHOLOGY.

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I.

Darwinism has never been a really vital issue in psychology. Occasionally a theologian or a naturalist has inveighed against the Darwinian theory of mental evolution, but the psychologists as such have rarely uttered a protest. In view of the storm of vituperative scientific criticism precipitated by the publication of the *Origin of Species*, this fact is distinctly significant. Indeed, so much a matter of course have the essential Darwinian conceptions become, that one is in danger of assuming fallaciously that Darwinism has no important bearing on psychology. How Darwin's radical theories succeeded in gaining such easy access to the psychological sanctuary is a matter of distinct interest upon which a few speculative comments may be made.

It must be borne in mind, then, that Darwin's most revolutionary ideas on mental evolution did not appear until the publication of the *Descent of Man* in 1871. This was nearly thirty years after Weber's epoch-making experiments on sensations, almost a score of years after the appearance of Lotze's medical psychology, sixteen years after the issuance of Spencer's evolutionary psychology and Bain's work on the *Senses and Intellect*, with its excellent presentation of the facts of nervous organization, eleven years after Fechner's publication of the *Psychophysik*, nine years after the first edition of Helmholtz's *Sensations of Tone* and seven years after his *Physiological Optics*. It was only three years in advance of the first edition of Wundt's *Physiological Psychology*. There had thus been rapidly growing during the preceding thirty years a disposition to view mental life as intimately connected with physiological processes, as capable of investigation along experimental and physiological lines, and finally as susceptible of explanation in an evolutionary manner. Moreover, by the time the *Descent*

of Man was published the weight of scientific authority, so heavily against Darwin at the time of the publication of the *Origin of Species* in 1859, had swung unmistakably to his support.

Another circumstance of probably more than negligible moment is found in the fact that the major interest of many psychologists has always been in the more narrowly analytical problems of mind. On these problems Darwinism has had little immediate bearing and has exercised only the smallest fructifying influence. Its contentions have seemed, therefore, to demand no very vigorous partisanship either one way or the other.

The effect of certain philosophic tendencies ought, no doubt, to be added to this brief survey of contributory influences, but the considerations already offered are probably sufficient to indicate in part, at least, why the publication of the doctrines of mental evolution expounded in the *Descent of Man* occasioned so little psychological flutter and in many quarters awakened so warm and enthusiastic a welcome. They also serve to explain why it is so difficult to assign with confidence the precise contribution of Darwin's thought to current conditions in psychology. Many convergent forces have been at work and the independent effects of each are hardly to be discriminated. Nevertheless, it is clear that Darwinism exercises a very potent influence in psychology, not alone as regards general standpoint and method, but also as regards certain specific doctrines.

In the matter of general method we may certainly attribute to Darwinism the larger part of the responsibility for the change which has brought into prominence functional and genetic psychology (including animal psychology), in distinction from the older and more conventional analytic psychology. Here again many influences have contributed to the final outcome, but it is fatuous to suppose that the genetic movement in psychology could have attained its present imposing dimensions had it not been for the inspiration of Darwin's achievements. The analytical methods will no doubt always retain a certain field of usefulness, and an indispensable one at that, but our larger and more significant generalizations, our more practically important forms of control over mental life are going to issue from the

pursuit of methods in which growth, development and the influence of environment, both social and physical, will be the cardinal factors, methods which will in other words apply Darwinian principles with, let us hope, Darwin's tireless patience.

Darwin's more specific contributions to psychology may be grouped under three main headings: (1) his doctrine of the evolution of instinct and the part played by intelligence in the process; (2) the evolution of mind from the lowest animal to the highest man; and (3) the expressions of emotion. This is the chronological order in which these topics were given publicity by Darwin and we may properly adopt it in discussing the problems involved.

II.

The solution of the first issue, *i. e.*, the genesis of instinct and the part played by intelligence in such genesis, bears primarily perhaps on the field of animal psychology, but it certainly has a very definite interest for human psychology as well. At first blush it might seem that instinct is altogether a matter of muscular activities and neural mechanisms and that mentality has little or nothing to do with it. But a closer inspection of the actual manifestations of instinct serves to disabuse one's mind of that impression. Not only are human instincts honeycombed with psychic influences, but even animal instincts show themselves variable and adaptive to specific situations in ways which hardly permit any other interpretation than that of conscious adjustment. Take the imperious mating instinct as an instance. Among birds of many species there is every evidence that despite the impelling force of impulse, the female exercises a very definite choice in which to all appearances psychical impressions are potent. But the question still remains whether intelligence is a true cause in the *production* of instinctive acts, or whether it merely comes in occasionally to modify them. Herbert Spencer is cited with questionable justice as representing one extreme opinion in this matter.[1] It is alleged that he holds that instinct is simply compound reflex action and that

[1] Cf. Romanes, *Mental Evolution in Animals*, p. 256. I find it difficult to be certain from a reading of Spencer's own statement just what position he really holds on this matter.

it is always the precursor of intelligence. This is clearly the view of many modern physiologists and naturalists, of whom Bethe and Loeb are illustrations. From this standpoint consciousness is not essential to the formation of instinct. Among English and American writers G. H. Lewes and Cope represent the other extreme, maintaining that all instincts are originally intelligent conscious acts, from which conscious control has largely or wholly disappeared. Some authorities like Romanes have held that consciousness is at all times operative in instinct and that it is precisely the presence of consciousness which distinguishes instincts from mere reflexes. This general view held with sundry modifications by numerous writers, among others Wundt, is known as the 'lapsed intelligence' theory.

Darwin[1] himself seems to have been less interested in the question as to whether mind is always present in instinctive reactions than in the question of its relation to the origin of instinct. His view seems to have been that instincts are in part due to the inheritance of useful habits consciously acquired, and in part due to the effects of natural selection operating on chance variations in conduct. Of the two he regards natural selection as the more important, because many instincts cannot have been inherited habits (*e. g.*, those of neuter insects), and because the selection of slight variations in action through many generations seems to him plausible by reason of the conclusive evidence of a similar process in the evolution of structures.

Against the natural selection argument, as it pertains to the supposed preservation of incremental variations of a useful sort, it has been urged that in not a few instincts this is an impossible assumption, because the whole value of the instinct depends on the appropriate execution of each step in a long series of acts, each one of which alone, and any group of which apart from the others, is useless. Natural selection could only furnish an adequate explanation provided the whole series of complex acts sprang into existence simultaneously. To suppose that this occurs is to assume the miraculous. Stated abstractedly this

[1] Cf. Darwin, *Origin of Species*, Ch. VIII.; Romanes, *Mental Evolution in Animals*, Appendix.

criticism appears forceful, but in view of our profound ignorance of the stages through which complex instincts have actually passed, it seem wise to be conservative in estimating the significance of the criticism.

It will be noted also that Darwin speaks quite explicitly of his belief that acquired habits are transmitted. The doubt which attaches to this doctrine in the minds of competent contemporary zoölogists is well known. Darwin quotes as illustrating his point the alleged acquirement of fear of man by birds in certain of the oceanic islands remote from the mainland subsequent to the coming of men and the pursuit of hunting. Certain cases of alleged transmission of characteristics as a result of mental training among dogs appear also to have weighed heavily in his mind.

If such acquirements *are* transmitted by heredity, then it must be admitted that this factor, together with the natural selection of such instinctive variations as arise naturally and after the manner of structural variations, would no doubt largely account for the phenomena with which we are familiar. But as we have just pointed out, difficulties beset both parts of this program.

A compromise view which is put forward with the joint authority of Morgan, Osborn and Baldwin,[1] under the title 'organic selection,' maintains that consciously acquired habits are probably not directly transmitted, but that consciousness plays an indispensable part in the drama by enabling successive generations of creatures to accommodate themselves to the vicissitudes of life while the slow changes are taking place which finally issue in the completed instinct. Not only is consciousness operative in this way, but in all the higher forms of animal life it is held that conscious imitative activities also play a part, and with man a dominant part, in setting the racial pattern. Natural selection serves to lop off the feeble and incompetent, both among individuals and groups, while all this process is going forward, but the successful issue is fundamentally dependent on conscious reactions during the critical formative stages.

In the midst of uncertainty and speculative ingenuity such

[1] Cf. Baldwin, *Development and Evolution*, especially Appendices A and B.

as this, many minds will look with hope and a certain relief on the efforts of a group of zoölogists and physiologists — illustrated by Jennings and Loeb — who have made persistent and in no small measure successful attempts to modify instinctive behavior by experimental methods, thus securing at once some rudimentary insight into the mechanics of the instincts, instead of waiting for nature to reveal her secrets at her pleasure. In the lower organisms where such experimental control is most feasible, already the dependence of certain forms of instinctive behavior on conditions of temperature, light and oxygenation has been demonstrated and it hardly seems unduly optimistic to hope that through such means we shall ere long be able to substitute for speculative theories on the *modus operandi* of instinctive behavior something more nearly resembling knowledge. At present we can only say that we know with reasonable certainty that many instinctive acts are accompanied by consciousness, that practically all of them are variable within limits, that some of them appear to be modified by conscious forces, that possibly consciousness has played a part in the formation of some of them as it seemingly plays a part in their actual workings, that natural selection would certainly account for many instincts and perhaps for all.

We come now to consider Darwin's view of mental evolution.

III.

Darwin[1] held that the mind of civilized man is a direct outgrowth of the animal mind. He maintained that from the lowest animal upward we find evidence of mental processes which increase in range and power, but do not change in kind, until we meet their most complete expressions in man. In man himself he finds again no evidence of aught but continuity of development from the lowest savage to the highest genius.

Darwin not only teaches the continuity of mental evolution from the lowest to the highest forms of animal life, he also urges the value of mental factors in the operation of both natural and sexual selection. Men and animals alike that were alert and intelligent in their adaptive acts would enjoy a larger chance of

[1] Cf. Darwin, *The Descent of Man*, Chapters III. to V.

life and leave behind them a more numerous posterity. In those orders of animals where the female exercises selective control in the choice of a mate, he urges, as has already been indicated, that psychical factors enter in an important degree to determine the feminine preference.

His survey of mental characteristics on which these doctrines are based is somewhat naïve. The psychic qualities which he cites as a foundation for his statements are as follows: sensations, pleasure, pain, passions, emotions (terror, suspicion, fear, anger, courage, timidity, love, jealousy, emulation, sense of humor, wonder, curiosity), imitation, attention, memory, imagination (whose presence in animals he regards as proved by behavior indicating dreams), and reason, which in animals, he says, is closely allied with instinct. These categories are all taken quite simply and with no special effort to indicate precisely what may be meant by them. He contents himself by citing illustrations of animal behavior, which seem to him to indicate the presence of these several mental attributes.

He undertakes to fortify his general position by a refutation of the several stock arguments commonly advanced to support belief in the radical distinction between animals and man. Of these we may pause to mention only a few.

He meets the assertion that animals make no use of tools by citing the case of the chimpanzee who is said to use stones to open nuts, and by the case of the elephant who uses branches to protect himself from the assaults of flies. He might have cited many other similar cases, but it is to be observed that he makes no very satisfactory attempt to meet the further points that animals do not fashion utensils and that they do not use fire. For the present generation, however, this type of consideration has somewhat lost interest. He believes the opinion that animals do not form concepts and that they are incapable of making abstractions is not well founded. He cites as an instance of the appreciation by animals of something akin to an abstract idea, the attitude which a dog will assume in response to the exciting question, "Where is it?" The simple-mindedness of this conclusion must inevitably furnish amusement to the sophisticated animal psychologists of the present day. On the

matter of language he occupies a position distinctly favorable to the possession of rudimentary language forms by animals. He cites the fact that many animals have calls expressive of emotion, and these calls he regards as essentially linguistic. He also mentions the use by parrots of significant words as a case demonstrating his contentions. Again, the sense of beauty has been held to be a purely human attribute. But this view Darwin feels is definitely controverted by the fondness which certain animals display, especially birds, for colors and plumage. The possession of conscience and the belief in God have frequently been urged as the sole possessions of humanity. To this assertion Darwin replies that the belief in God is not universal among human beings and hence not generically human, and the actions of many animals, notably dogs, indicate something closely akin to the feelings of conscience. To the contemporary psychologist all this sounds highly archaic and scientifically anachronistic and so no doubt it is. But in view of Darwin's extensive innocence of psychology, it represents, as he marshals his facts, an amazing range of original observation and a most intrepid mind.

In the last analysis, despite the statements of the preceding paragraph, Darwin regards the development of conscience, or the moral sense, as by far the most important practical distinction of man from the animals. He says, however, that any animal endowed with well-marked social instincts, such as the parental or filial affections, would develop man's conscience as soon as he developed man's intellectual capacity, or even approximated it. The social and gregarious habits of many animals obviously furnish an excellent point of departure for such a development. Moreover, sympathy, which plays an important part in all moral evolution, seems to be manifested by certain animals. There is therefore no evidence anywhere for radical differences between man and the animals.

It may be of interest to remark certain typical divergences from this general position in which, however, Darwin has found not a few loyal followers. Indeed, at the present time it is undoubtedly the case that most psychologists share Darwin's main convictions as to the continuity of mental evolution from animal

to man, less perhaps as a result of careful scrutiny of the facts than as a consequence of a powerful drift from every direction toward the belief in a common origin for human and animal characteristics. We feel more comfortable nowadays in a world where simple and uniform rules obtain.

Probably the most persistent and most substantial point of dissent from Darwin is represented by writers who like Mivart[1] hold that although men and animals have certain forms of conscious life in common, for instance, sentience and memory, man alone can frame true concepts, and man alone can use true signs, can create and use language. Only man has ideas. Whereas we find essential continuity from the lowest to the highest of *bodily* forms, in *mental* processes we meet a real break, separating the human and spiritual, from the merely sentient and brute.

This type of view has always commended itself to a certain stripe of religious belief, because of its seeming provision for a somewhat super-naturalistic element in man, and its protest against regarding him, or at least his ancestry, as substantially on a level with the beasts of the field.

Moreover, it can summon to its support not a little apparently valid evidence wherein alleged instances of the animal use of language and signs are shown capable of another and more rudimentary interpretation. We are, of course, unable to intrude upon the inner workings of the animal consciousness, and it must be confessed that in so far as we judge by external conduct, few, if any, of the instances adduced to prove the formation by animals of concepts or of language really furnish unequivocal evidence of the thing to be proved. Meantime, it should be clearly recognized that this position, as advanced by Mivart at least, does not rest for its severance of man from the animals simply on the classical contention that he has a soul while they possess only minds. It is a distinction in the field of mind itself, which is here emphasized, an ascription to man, as his unique possession, of capacities which constitute the higher stages of cognitive activities.

Another divergent line is represented by the celebrated

[1] Cf. Mivart, *The Origin of Human Reason.*

naturalist Wallace,[1] who shares with Darwin a part of the credit for that revolution of opinion in the scientific world which generally is characterized with Darwin's name. Wallace is apparently willing to grant as a mere hypothesis that man's mind has developed *pari passu* with man's body, but he absolutely refuses to admit that natural selection could have brought this result to pass. He calls attention to three great familiar instances of alleged discontinuity in nature as suggesting that we should be scientifically hospitable to the idea of discontinuity. First, there is the breach between the organic and the inorganic, a breach which seems daily to shrink, but which has not yet been over-spanned. Then there is the equally marvellous break between the organic and the sentient, the conscious. And finally there is the break between mere sentience and rational intelligence — the distinction upon which Mivart dwelt so insistently.

Wallace cannot seriously call in question the possibility that natural selection should affect such mental qualities as quickness of eye and ear, accuracy of memory of former dangers and the like. It is the higher more definitely human qualities which apparently afford him foundation for his position. For example, what he calls the 'mathematical faculty' and the 'faculty for music' seem to him too remote from the life-subserving functions to have had any survival value, and unless they have such value, his position must be granted as having force against natural selection. On such grounds, in any case, he rests his contention that there is in man a spiritual essence not inherited from his animal forbears to whom he owes his bodily structure. By virtue of this essence human progress is possible and a spiritual life beyond the grave assured, for spirit cannot perish.

In reading Wallace one feels the presence of a vein of mysticism and the impelling influence of religious pre-possessions . . . influences which may properly be given a hearing, but which must not be treated as standing on the same logical level with ordinary empirical evidence. Whether natural selection can reasonably explain mental development in its higher ranges, is however, a perfectly fair question and one which deserves, and from ethical writers at least has often received, serious consideration.

[1] Cf. Wallace, *Darwinism*, Ch. XV.

It seems perfectly clear that certain familiar intellectual and emotional endowments would have had a very positive survival value both among animals and men. Those individuals who were mentally quick and inventive, who were courageous, cunning and pushing, would certainly be at an advantage over those who failed in these characteristics. Other things equal, the latter would live shorter lives and leave fewer progeny. When one takes into account the conditions of life under gregarious or social circumstances, one sees clearly how in a group the social virtues of sympathy, bravery, self-sacrifice, etc., may condition the dominance of the group over competing groups and consequently how a survival value may attach to these mental and moral characteristics. All this is familiar and trite and probably true. But what is to be said of Wallace's case as it concerns mathematical, philosophical and musical capacities, to the possessors of which men have customarily paid large respect? Wherein do such characteristics display a survival value, and if they have none such, how can natural selection account for their preservation and cultivation?

The reply, I believe, is quite in keeping with the reply as to the survival value of sympathy and pity and self-sacrificing bravery. In course of mental evolution, no doubt many characteristics are developed which are either harmful or useless. The congenitally insane illustrate the appearance of harmful forms. Other forms appear which may be useless or even harmful to the occasional individual, but to the group as a whole they are highly valuable and by virtue of this fact they secure perpetuity, either by social imitation, or by direct heredity. Now we have only to assume the appearance of a mental strain which has such social value, to expect with certainty that it will be encouraged in most of those who possess it markedly. Music and mathematics and philosophy do not represent such highly occasional mental sports as Mr. Wallace implies. A respectable amount of each of these capacities is latent in all normal individuals. Propitious surroundings are not always at hand and other more seductive interests often secure the field in advance, so that these capacities remain latent and undeveloped. But nothing is more certain than this, that if society did not at least *consider* itself

benefited by the cultivation of these tastes, they would speedily disappear along with the taste for collecting scalps and wampum.

In other words, Mr. Wallace and others of his way of thinking take their natural selection too narrrowly when they come to the higher ranges of mental life. They forget the social pressure which is there exercised, not to create but to develop certain capacities.

Still another view which not only accepts but magnifies discontinuity in natural phenomena is conceived not in the interests of any idealistic metaphysical or religious tenets, but rather in frank hostility to such. This is the view typified by Loeb,[1] who believes that many of the lower organisms have no consciousness at all. This is a view which in more sweeping form Descartes long ago made famous, though on grounds quite different from those of Loeb. For Loeb, man's mind is a natural product of the evolution of animal mind, but animal mind itself begins not necessarily in the protozoa, but presumably at a relatively advanced point among the metazoa, at a point, namely, where we find creatures able to profit by experience, able to learn.

Accepting the analogy of many chemical phenomena in which a critical stage is represented, before and after which the resulting phenomena are apparently entirely discontinuous (*e. g.*, the formation of liquid from gas under given conditions of temperature and pressure) he urges that until precisely the correct molecular conditions are represented in the protoplasm of the nervous system, no consciousness will appear. But the moment these conditions are given, mind will also be present. It is not necessary to assume mind, or associative memory, as he prefers to call it, wherever we find a nervous system, much less wherever we find protoplasm in a living state. We have a right to allege the presence of mind only when the actions of an organism indicate its presence, and our only criterion for this presence is, as was above stated, the capacity to learn by experience, to improve the reactions made to stimuli.

The difficulty with this criterion is practical, not theoretical.

[1] Cf. Loeb, *Physiology of the Brain*, particularly pages 213 ff.

If one could always say with assurance that animals can or can not learn, the task would be easy. Unhappily such is not the case. Some animals learn to better a reaction after a few attempts, others require dozens of trials. Even the frog, whose intellectual capacities were once regarded as nil, has now been proved capable, under the advantages of higher education, of making some progress, but it is a progress which taxes both pupil and teacher, for it may require hundreds of experiences to improve even a very simple reaction. The criterion proposed, while theoretically admirable, leaves us as a matter of fact in much the position we occupied before, *i. e.*, inability confidently to allege that any living creature is wholly lacking in mind. Even the lowly amœba manifests certain peculiarities of action which may betoken consciousness of a low order.

An examination of these variants on the Darwinian view of continuity in mental development leads one to feel that the balance of probability distinctly favors the original formulation. Not only does modern psychology disclaim in man at least any such sharp lines between conceptual thought and the lower levels of sentient mental life, as Mivart and Wallace postulate, it has on the contrary expended no little effort in analyzing and defending the presence of just these conceptual processes in the sensory and perceptual activities of mind. Binet's[1] essay on the psychology of reasoning is a typical example of this tendency, exhibiting as it does the implicit reasoning process involved in every definite perception. To perceive that this object before me is a desk, involves identifying this present visual experience with antecedent visual experiences in a way which closely resembles certain phases of the process in syllogistic inference. Nor has this tendency in psychology been in any way influenced by partisan Darwinian prepossessions, so far as I know. It has been the inevitable outcome of penetrating analysis. The use of conscious meanings does not suddenly burst forth full-blown in a mind which before had given no indication of such an achievement. The simplest mental acts which as human beings we can detect in ourselves have some increment, however small, of this consciousness of meaning, this embryonic form of con-

[1] Binet, *La Psychologie du Raisonnement.*

ceptual thought. Nevertheless, it must not be forgotten that animals have certainly not been as yet proved to reason in human ways. On this score Mivart and his cohorts must be given their dues.

Nor is the dividing line which Loeb has proposed likely to result in any radical alterations in the general Darwinian position. For not only do we find it difficult to use the criterion Loeb offers, *i. e.*, educability, but in point of fact we have considerable evidence at hand to show that even the lowest animal forms modify their behavior somewhat to meet changed conditions, and that these modifications are of a kind which in higher animals would be regarded as indicative of the presence of consciousness.

IV.

This brings us to the work on emotion. In his treatise on *The Expression of the Emotions* Darwin has brought together with characteristic patience and industry the most extended array of observations bearing on the subject, an array which has been of notable value to the defenders of the James-Lange theory of emotion. As finally put forth the work is a defense of three familiar theses concerning emotional expressions. The first holds that serviceable bodily reactions become habitual and become associated with the state of mind in connection with which they arose. When the mental state recurs, the bodily reactions recur also, although they may long since have lost any immediate and obvious utility. The clenching of the fist and the showing of the teeth in anger illustrate this conception. The second thesis, that of antithetic action, maintains that a state of mind opposed to one calling out a definite bodily attitude may evoke an opposite bodily attitude. As an illustration may be cited the fact that an angry cat naturally lashes its tail from side to side. On the other hand a cat which is pleased carries its tail erect and stiff. The third thesis, that of nervous overflow, holds that apart from the two previous principles of explanation, conditions of emotional excitement are prone to release more cortical energy than can be effectively disposed of in the usual ways, and the superfluity pours out in muscular contractions of the most various kinds.

So far as concerns the adequacy of these explanatory hypotheses, it may be said that in the light of our present knowledge the first affords a highly probable account of certain emotional reactions, while it is quite inadequate satisfactorily to explain others. The second hypothesis has always been viewed askance, as something of a scientific *tour de force*, while the third, which Darwin himself treats rather as a catch-all to take care of cases found bothersome to handle by his first two hypotheses, is probably of much more fundamental import than he imagined. In any event later writers have been unable to improve materially upon Darwin"s catalogue of the causative influences provocative of our emotional attitudes.

V.

In conclusion we may venture a brief comment upon the methods now current in the study of evolving mind and more particularly upon the methods and points of view now dominant in animal psychology. A few words may also be added upon a group of problems suggested by Darwin's work.

The most marked and unmistakable change which we notice in method is the somewhat aggressive skepticism now everywhere entertained for the anecdotal foundation on which many of the early zoölogical doctrines about animals were based. Darwin himself quotes numerous tales to substantiate his positions and his disciples have far outdone the master. This condition of things has led not unnaturally to a reaction in favor of laboratory experiments and observations under conditions of control. To this procedure there is never lacking acrimonious protest on the part of those who hold that only under the conditions of nature can the intimate facts of animal life be seen and understood. No doubt there is a large measure of justice in this protest. But fortunately it is now possible in many of our laboratories and zoölogical stations to simulate with large success the conditions of life which are natural to many animal forms. The result has been a wealth of new material which promises quite to revolutionize many phases of animal lore. It seems not unreasonable to anticipate that the effect of such work will not only be felt in the direct increase

of our reliable information gained through these channels, but also that the observation of animals in a state of nature will be rendered far more intelligent and precise by virtue of the suggestions which will be gained from work of this type. Certainly such work has already brought us new and more exacting standards of accuracy and taught us an invaluable caution and conservatism both in inference and in generalization.

Conspicuous among the many interesting psychological problems suggested by Darwin's work is that of the determination of mental types, species and genera, following rudely the analogy of species and genera in zoölogy. The practical difficulty in defining a species need occasion us no concern, because the *idea* of species has had great value, despite the perplexities attached to the satisfactory differentiations of particular classes. If the type of intelligence manifested by an animal be contingent upon the structure of its nervous system, as is apparently the case, it would seem to follow as a reasonable inference, that we might expect to find groups of animals evincing in their behavior psychic characteristics of a similar pattern, just as we find forms of nervous system highly similar to one another. It is of course conceivable that in different animals different nervous structures should function to produce similar psychic behavior. But even recognizing this possibility, it still ought to be feasible to group creatures together as belonging to various great psychical type-forms.

At present the common divisions follow other lines. Animals which belong to the same family, *e. g.*, the dogs, are thought of as resembling one another in general mental pattern and as differing from other animals partly in their instincts, but partly also in their capacity to learn non-instinctive reactions. This practical view of the matter leaves us with as many main patterns as there are genera and with no explicit and tangible description of any one. The other line of demarcation consists in cross-sectioning such a division as the preceding by distinguishing between such psychical characters as sentience, memory and reason, ascribing all these attributes to the higher creatures and denying one or another to the lower creatures. Amœba may be thought to have sentience, but not reason and

only dubiously memory. The pigeon has sentience and memory, but probably not reason, whereas men and possibly some of the higher animals have all three capacities.

Obviously neither of these modes of classification affords us any real insight into psychic types. If Darwin's fertile investigations are to bear fruit in this direction in psychology, we must be able to portray the entire range of mental processes belonging to the great divisions of animal life, to show where and how these dividing lines part company with those which now bind animal forms together on structural lines. For ordinary zoölogical purposes the dog and the elephant have little in common except their mammalian hall-mark. But in their psychic types they may be very similar.

Such types may clearly be grouped around various central factors. Animals in which the so-called 'distance receptors' (auditory, visual, olfactory) are well-developed, may present a pattern with the psychic life all grouped about these processes. In other animals the 'contact and proprio-ceptive' organs may be the centers of psychic life and in consequence give rise to quite another mental pattern. In one or in both, the psychic operations may be of the most rudimentary and immediate sort, or they may, on the other hand, involve processes comparable with the simpler forms of human inference. The patterns may vary again in dependence upon the relatively large or relatively small amount of purely instinctive and reflex activity. They may vary with the phylogenetic antiquity of the form, newer types being more plastic than older ones. Many other principles of grouping will readily suggest themselves.

At the present moment we have the beginnings, but only the beginnings, of the necessary data for the solution of this general problem. We have learned, for example, that the mere presence of a sense organ does not argue such a use of it as casual inspection would suggest, much less such as is suggested by the analogy of human sense perception. We have accordingly learned caution in assuming that the sensory activities of animals involve the sort of consciousness which we know in ourselves. Indeed our whole tendency now-a-days is to recognize and frankly admit, that inasmuch as we must infer the

psychic operations of animals wholly in terms of their behavior, we are under peculiar obligation to interpret their activities in the most conservative possible way. We know that the 'try-try-again, method' is the one commonly used by animals in solving laboratory problems. But we are for the most part profoundly ignorant as to just what occurs when progress is actually made, what sensory avenues are most important for giving information and how far the counterparts of human inference may at times be present. To secure these and dozens of other items of information needful for the execution of the program proposed will require long years of patient labor. Nevertheless, until this work is done, we shall remain powerless to describe the great stages of developing mind. The task is eminently worth while and is certain to be accomplished. Only when it is accomplished will it really be possible to entertain an intelligent judgment concerning the fundamental contentions of Darwinism concerning the evolution of mind.

DARWIN AND LOGIC.

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In attempting to estimate the influence of Darwin's thought in different fields of inquiry, it is advantageous to distinguish between the direct and the indirect results of the conceptions which he introduced. By direct results, I mean primarily the effect of the conception of natural selection, as an explanation of the formation of species, upon the problems and methods of the biological sciences. And, as all the characters and functions of living beings, mental as well as physical, are subject-matter of biology, the explanation of the mental endowments and characteristics of man and the lower animals through the principle of natural selection may be included under the same heading. This can be done the more readily because of Darwin's own employment of the principle to explain, not only the instincts and emotions of living organisms, but also to some extent the intellectual and moral endowments of the most highly evolved animal. Indirect consequences are always difficult to trace in detail. From the standpoint of science, the most obvious and important indirect result of Darwin's discovery is the confidence which it furnished in the fruitfulness of the method of tracing origins in all fields of inquiry. In the process of becoming, Darwin's procedure showed, things progressively define and specify themselves through their positive and negative relations to other things. In the impetus thus given to the evolutionary method, there was strengthened and extended the influence of an instrument of analysis whose full power and significance has scarcely yet been realized.

It is only a commonplace to say that the publication of the *Origin of Species* revolutionized biology. For this work transformed the evolutionary hypothesis of the gradual formation of biological species from an *a priori* speculation, which was scarcely if at all influencing workers in this field, into an estab-

lished and fruitful principle of explanation. Thus in a marvelously short time the stone which the builders had rejected became the head of the corner. Important and far-reaching as this result is in itself, it is the wider application of the evolutionary conception, which Darwin may thus be said to have called into existence as a working principle of natural science, that gives to his discovery its main interest and significance. "If we may estimate the importance of an idea by the change of thought which it effects," says Romanes, "this idea of natural selection is unquestionably the most important idea that has ever been conceived by the mind of man."[1] In his enthusiastic estimate of natural selection, Romanes, of course, assumes that it was this principle alone which made possible an intelligible and workable theory of evolution. After showing how little scientific thought had really been influenced by the earlier evolutionary hypotheses, he continues: "It was the theory of natural selection that changed all this, and created a revolution in the thought of our time, the magnitude of which in many of its far-reaching consequences we are not yet in a position to appreciate, but the action of which has already wrought a transformation in general philosophy, as well as in the more special science of biology, that is without a parallel in the history of mankind."[2]

In general philosophy and in the historical and social sciences, the notion of development and the evolutionary method of investigation had made their influence felt long before Darwin's discovery of natural selection had rendered their application fruitful in biology. From the time of Leibniz the notion of a continuous development had been familiar to philosophers. It exerted little influence, however, until the second half of the eighteenth century, when it appears both as an hypothesis in biology and as an interpretation of the spiritual history of the human race. In biology, as we have seen, it remained without practical effect because its factors or definite mode of procedure had not yet been discovered. But in its application to history, the method made its way through the influence of Lessing, Herder, Schlegel and Kant, and finally became, one may say, the main motive of

[1] *Darwin, and after Darwin* (1901), Vol. I., p. 256.
[2] *Ibid.*, p. 259.

post-Kantian idealism. In Hegel, the notion of *Entwicklung* is, even more explicitly than in Fichte and Schelling, the guiding method and explanatory principle. In his *Logic*, an attempt was made to exhibit the laws of the evolutionary process in their complete universality — to give in general terms that are applicable within the whole range of experience something analogous to what Darwin afterwards furnished in the special field of biology, a demonstration of the stages and working principles of the movement. Hegel's philosophy influenced historical study very greatly; especially, it gave an extraordinary interest to investigations into the thought systems, language, customs, and institutions of human society. The same fundamental motive, though limited in various ways by special interests and arbitrary assumptions, shows itself in the work of Comte. In England, as is well known, Herbert Spencer had recognized the significance of the evolutionary principle and begun to work out its ethical and social consequences before the appearance of Darwin's great work. Even J. S. Mill — as I think is evident both from his logical and ethical writings — was influenced by organic conceptions, which he probably learned mainly from Coleridge and Comte, and was thus led to attach a much greater importance to the historical and social sciences than had his immediate predecessors.

In philosophy, then, and in the field of the humanistic sciences, it is evident that the application of the doctrine of evolution had not to wait for the discovery of the principle of natural selection. It might therefore be inferred that in these departments of knowledge the principle has no application, or is at least of subordinate importance. Whatever conclusions we may later reach regarding the direct applicability of the conception of natural selection to the humanistic fields of inquiry, it is necessary to recognize that, indirectly at least, these subjects were stirred into new life by the influence of Darwin's thought. For though, as we have seen, the concept of evolution was already being employed by workers in these fields, its influence was extending very slowly. It lacked definite and concrete formulation, and hence had never fully come to its own. Few even of those who were applying the principle at that time

firmly grasped its significance, or realized clearly its transforming power. Hegel's unbounded confidence in his method, which has often been regarded as presumptuous, is really confidence in the validity and efficacy of his conception of development; and the *Logic* is his attempt to fully define and exhibit in detail, in the most universal terms of experience, the nature of that principle. But Hegel's detailed working out of the method of evolution was not generally understood, and exerted little influence on the succeeding generation. This was due partly to the artificial form which he gave to his exposition, and partly to his inability, through lack of material, to base his results upon the facts of the physical sciences and of psychology. His conclusions were indeed derived from a wide survey of facts, but these facts belonged to the inner life of man and society; and thus, as not directly given to sense perception, they were too remote from ordinary experience to appear concrete and impressive.

Darwin's formulation of the evolutionary doctrine, on the other hand, rested on observations of the commonest facts of daily life. It drew its support from the experience of the breeder of domesticated plants and animals. Moreover, it provided a definite working mechanism for the evolutionary process that rendered its operation conceivable in scientific terms. But these facts do not in themselves explain the extraordinary influence which Darwin's conceptions quickly came to exert outside of the field of biology. There can be no doubt that this was primarily due to the fact that Darwin himself showed that his theory definitely linked man to the lower animals; and this consequence was further emphasized and enforced by able disciples like Haeckel and Huxley. Not only did the proof of the 'descent of man' rouse popular interest and give rise to theological controversy, but it tended to break down the wall of partition between the humanistic sciences and biology. The success of the evolutionary method in biology brought fresh courage and renewed confidence in the fruitfulness of their method to the humanistic sciences that were already employing evolutionary conceptions. But this is not the only effect that Darwinism has produced in these fields. The place which the

doctrine assigns to man as a member of the biological series seems to demand that the biological evolutionary conceptions shall be used to interpret all the phases and manifestations of human life, mental as well as physical.

The immediate problem of this paper has to do with the influence of Darwin's discovery on Logic. What I have said of the indirect influences of Darwinism has, of course, its application to logic, as will appear from time to time in our discussion. We may ask, however, at the outset, how far has the principle of natural selection 'furnished guidance' in the attempts to explain the development of thought and the structure of knowledge? As we have already seen, Hegel's treatment of logic is distinctly evolutionary, as is also that of other idealistic writers, the so-called neo-Hegelians who work with the same general conceptions which he employed. We will, accordingly, ask in what ways this older conception of logical evolution has been modified by Darwinian conceptions, and attempt in a summary fashion to furnish an estimate of the value of these modifications from the standpoint of logical theory.

Darwin's great service to biology consisted in his statement of the working factors of evolution. He was the first to give a 'sufficient reason' for the transformation of species by pointing to the natural causes which are continuously in operation. The *modus operandi* of biological evolution is given in the conceptions of variation, natural selection (including sexual selection), and heredity. It is an observable fact, says Romanes, "that in every generation of every species a great many more individuals are born than can possibly survive; so that there is in consequence a perpetual battle for life going on among all of the constituent individuals of any given generation. Now, in this struggle for existence, which individuals will be victorious and live? Assuredly those which are best fitted to live, in whatever respect, or respects, their superiority of fitness may consist. Hence it follows that Nature, so to speak, *selects* the best individuals out of each generation to live. And not only so; but as these favored individuals transmit their favorable qualities to their offspring according to the fixed laws of hered-

ity, it further follows that the individuals composing each successive generation have a general tendency to be better suited to their surroundings than were their forefathers."[1] Darwinian evolution thus results in a continuous adaptation of the species to its environment through the elimination of the unfit and the accumulation of favorable characteristics through heredity. Hence natural selection, taken in combination with variation and heredity, is able to explain, not only specific and individual forms regarded as wholes, but also the special constituent characters and functions of the species that have survived. And, as the living organism is psychical as well as physical, these principles apply directly to the mental life of all animals, including, of course, that of man.

It is natural, then, that biologists, viewing man as a member of the biological kingdom, should extend the principles of their science so as to include within their range all the forms and functions of experience. Darwin's treatment of the instincts and the emotions opened the way to important results in psychology; and the functional view of psychology, which regards the mind as an organic function whose origin and modifications are to be explained in biological terms, is only following in the path which he marked out. But Darwin goes further, and, like some of his successors, seems to suppose that these principles of functional psychology or biology are adequate to explain all forms of experience. "Although perhaps nowhere distinctly formulated," says Alfred Russell Wallace, "his whole argument tends to the conclusion that man's entire nature and all his faculties, whether intellectual, moral, or spiritual have been derived from their rudiments in the lower animals, in the same manner and by the action of the same general laws as his physical structure has been derived."[2]

Now, it was not in accordance with Darwin's purpose to work out the detailed application of his principles to the mental life in the form of psychology, or ethics, or logic; and he recognized

[1] Romanes, *op. cit.*, Vol. I., pp. 259–260.

[2] *Darwinism*, 2d ed. (1889), p. 461. The author continues: "As this conclusion appears to me to be supported by inadequate evidence, and to be directly opposed to many well-ascertained facts, I propose to devote a brief space to its discussion."

that he had no special equipment for such investigations. He contents himself, therefore, with indicating the standpoint and material of such inquiries, giving details only when his own observations and reflections enabled him to call attention to new facts. His treatment of logical functions and judgments is much less extensive than his discussion of moral experience, though the suggestion which he makes in Chapter V. of the *Descent of Man* regarding the function of imitation has led to important results in logic, as well as in other fields. And further than Darwin, so far as my knowledge extends, no biologist has gone in explaining logical forms of experience. But the biological point of view necessarily explains the forms and categories of thought, the very nature of reason itself, as functions of the living being that are to be explained by the general laws of biological evolution. The carrying out of this program, however, Darwin rightly leaves to the psychologist and the logician.

Now, I cannot see why any objection should be raised to the biological method of explaining experience, so long as this is not taken for philosophy. Logical thinking and moral action, whatever they may be in addition, are from one point of view, modes of living, and as such undoubtedly prove of advantage to the organisms which are characterized by them. If the objection be raised that this standpoint fails to exhibit what is essential in these experiences, the reply is, I think, that philosophy cannot afford to ignore any genuine aspect of experience, and that what we may choose to call merely ' external relations ' cannot be devoid of philosophical significance. This much at least is true: that the unitary view of the psycho-physical organism and its activities, which biology has emphasized, is a good antidote to the abstracting tendencies of both physical and mental science.

The objection to the biological interpretation of logic, and of experience generally, holds only when it is put forward as philosophy. The limitation of these accounts of experience does not consist in their lack of details — the details may be worked out in time — but is a limitation of principle. They simply do not raise the logical problem, or give any account of the values that are operative within experience as experience.

They look upon experience from the standpoint of an external observer, and hence can deal only with objects and the external relations of objects. But, though mentality is a life function, as *experience* it is internal or for itself. And this is equivalent to saying that it is now constituted by new functions implying new ends in the light of which it must be understood. To understand experience as experience, which is the special business of philosophy as distinguished from natural science, is to interpret its various developing stages in the light of the system of ends which is being realized. For logic, then, thinking is not rightly construed as adjustment to the environment, whether physical or social. External terms like 'adjustment' and 'environment' are misleading metaphors as descriptions of logical results and relations. Of course, the thinking of the individual grows out of life. But, as in the case of the state, which Aristotle remarks *originates* in life but *is* for the good life, we may say that cognition has a natural origin but *is* for the sake of truth and consistency.

Moreover, in logical experience the opposition between organism and environment, which is essential to biological evolution, has become transformed into the distinction between subject and object. This distinction falls within experience and is not a relation between experience and something external to it. Thinking, therefore, cannot be externally determined; it is a self-determining process whose 'developmental factors' are organic to the process itself. The moving principle of the whole is just the nature of thought itself regarded as a demand for completeness and consistency of experience. It is this immanent principle of reason or intelligence which, as the presupposition of all *experience*, is thereby presupposed *in all science*. Of course, the thinking experience from this point of view is no longer a function of an organism, a mode of experiencing over against the experiencing of other psychic individuals. As logical thinking, it is objective and social — the medium in which we are shut together with persons as well as with things.

This will be recognized as in general outline identical with Hegel's conception of the logical standpoint. It is in this sense that he speaks of 'absolute thinking' and 'absolute ex-

perience' — a mode of expression which has proved to many a stone of stumbling and a rock of offense.

Dissatisfaction with the standpoint and procedure of this idealist logic is, however, expressed in different quarters by writers whose main work lies within the field of psychology and philosophy, and in some of these writers the influence of biological conceptions is more or less directly evident. What is regarded as lacking in the logic of Hegel and his followers is: first, an account of the development of knowledge from the point of view of individual experience; and secondly, a detailed working out in concrete terms of the psychological motives and processes through which logical results are obtained. To overcome these defects and base logic upon psychology seems to be the program of the majority of recent writers on *Erkenntnistheorie*, in Germany, though in that country a controversy is still going on between the advocates of the 'pure' and the 'psychological' logic. The influence of biological conceptions is perhaps most clearly evident in Avenarius and Mach. Indeed, the latter might be perhaps fairly classified as 'Darwinian' in his general view of the origin and function of thinking, though his account of experience is given in terms of Hume's analysis.[1]

It is obvious that a complete account which should attempt to trace both the direct and indirect effect on logic of Darwin's contribution would extend far beyond the limits of this paper. I should like, however, to refer to the influence which this 'scientific' view of evolution appears to have exerted on the treatment of logical problems by certain contemporary writers in this country. This influence is manifest, I think, in many of the papers contained in the Chicago *Studies in Logical Theory*, and in various contributions to periodical literature by the same writers. It has perhaps also furnished the main inspiration for Professor Baldwin's work on logic. Though there are some important differences between Professor Baldwin's views and

[1] Simmel's name should also be mentioned in this connection. The application of Darwin's principles to logical questions is evident in his articles, 'Pensée théorique et intérêt pratique,' *Revue de Métaph.*, IV., pp. 160–178, and 'Ueber eine Beziehung der Selectionslehre zur Erkenntnistheorie,' *Archiv f. syst. Philos.*, I., pp. 34–46.

those of the pragmatic evolutionists, they belong together in general standpoint and aim. Not only do they both approach the problems of logic from the psychological point of view, but both alike derive their working conceptions from the biological formulation of evolution rather than from post-Kantian idealism. The 'newer' evolutionary influence is shown by the Chicago group of writers especially in their interpretation of thought as instrumental and practical, both in its origin and ultimate significance. Hence it follows that the logical problem is to describe and explain thinking in its dealings with a concrete situation. Thinking is always a process of adjustment, a means of securing adaptation, and, as such, does not give rise to any general problem regarding the nature of knowledge as such, and does not admit of interpretation in the light of any absolute end. Professor Baldwin, on the other hand, though holding to an instrumental view of the origin of the logical function and the tests of truth, refuses to adopt the pragmatic interpretation of the meaning and significance of knowledge. He seems to hold that, when the stage of logical experience is reached in the progression of cognition, new functions and meanings have emerged which cannot be adequately described in instrumental or pragmatic terms. In his case the Darwinian influence, however, seems to account for the dualism that persists throughout between the inner and outer 'controls,' which appears to be the survival under another name of the opposition between the organism and its environment. It is true that Professor Baldwin tells us that this dualism is to disappear in a higher form of experience of the type of æsthetic contemplation; but in the progress of logical development no genuine organic unity between thinking and its object is attained.

From the point of view of idealism, therefore, pragmatism is strong where Professor Baldwin's theory is weak, and weak where he is strong. The former position stoutly repudiates dualism, while he as explicitly refuses to construe logical experience in instrumental terms. While recognizing the force of the arguments that each of these parties directs against the other, the idealist is ready on occasion to demonstrate that the

dualism and pragmatism, which each finds unsatisfactory in the other, have a common root, and are both the logical outcome of the 'newer' evolutionary approach to the problems of logic. This general conclusion has already been urged from various sides against pragmatism. Moreover, as pragmatism has been for a considerable time the storm-center in logical discussions, and as I have more than once expressed my views in relation to it, I shall turn to Professor Baldwin's work as illustrating Darwin's influence on the method and procedure of logic.

What seems to me especially significant in Mr. Baldwin's work is the account, in the first volume of his *Thought and Things*, of the stages and means through which the individual mind develops a fully conscious logical experience. It is in part the same undertaking which Hegel left so incomplete in his *Philosophie des Geistes*, and which he combines so strangely with other topics in the *Phänomenologie* as to be almost unintelligible. The progress of biology and psychology have made it possible for Professor Baldwin to present a concrete and detailed working out of this problem which is an immense advance on anything that previously existed. And yet I cannot help thinking that he has been hindered rather than helped by his working conceptions. As I have already indicated, his standpoint is dualistic : the development takes place through the interplay of an inner and outer 'control,' which seem to be a translation into other terms of the organism and environment. The primary responses of the psycho-physical individual consists of motor adjustments. These, as they come to consciousness, furnish the contents of mind. "What we think is a function of what we have done." The unity of thought itself is 'the conscious side of the unity or synergy of material actions.' In short, Professor Baldwin's account professes to show, not the means through which the mind becomes conscious of its own logical nature, but how that logical nature is engendered in it through the motor adjustments of the organism to material conditions. It appears to him essential to derive the logical from the biological; to begin with logic or reason as implicit is to shirk explanation and take refuge in mysticism. But, after all, is it not true that sensations of processes of motor accommo-

dation are no more able to account for the organization of experience than sensations of any other kind. It is an old story, but nevertheless one that cannot be ignored, that a description of experience must take account of the mind as the central principle of that process. Leibniz's addition to the sensationalist formula — *nisi intellectus ipse* — has not been rendered superfluous by the progress of science.

Of course, in recognizing the function of interest or attention[1], even in the earliest forms of experience, Professor Baldwin may be said to admit the presence from the beginning of the interpreting activity of the mind. This, he might say, is 'the one continuous function' whose development and progression he is recording throughout his book. But although this 'universal function' is recognized in words, it is phenomenalized, equated with motor process, in the supposed need of 'scientific' explanation. One may, indeed, analyze attention into motor terms from the standpoint of structural psychology; but, as the function of meanings and the organizing principle of experience, attention is not a phenomenon to be explained at all, but is itself the presupposition of all explanation. This does not mean that the development must not be traced in detail. Professor Baldwin is quite right in insisting on the necessity of exhibiting the 'What' and the 'How' and 'Why' of the process. But it must never be forgotten that logical progression moves in the realm of meanings and functions, and that, consequently, the process is self-determining, the relation of its parts being the inner organic relation of means and end. That is, the account of the development of experience must be expressed in teleological terms, not in terms of cause and effect.

It is a common mistake to suppose that to employ teleology is to abandon analysis and resign oneself to a merely formal explanation. To appeal to this principle is supposed to be equivalent to an appeal from knowledge to faith. But philosophy has surely advanced far enough beyond Kant to recognize the necessity of teleology not only as a 'regulative,' but also as a 'constitutive' principle. Whether we are to hold that 'science' may be teleological, depends upon what we include in our notion

[1] *Thought and Things*, Vol. I., pp. 40 ff.

of science. At any rate, no one can deny that experience presents us with variously organized systems of value which require to be analyzed and described in order to be understood.

Now, Mr. Baldwin has in various writings insisted that in a genetic science the mechanical form of explanation no longer applies. He does not, however, abandon the causal category, but merely denies that in a developing series there is any longer an identity between the antecedent and consequent. It is the differentia of a genetic series that in the later terms something new appears which was not contained in the earlier. This appears to be equivalent to giving up all explanation; the 'something new' simply comes into the series as a miracle. But, although the conception is contradictory in principle, it enables Mr. Baldwin to escape the difficulties which a causo-mechanical theory would have to face, while at the same time assimilating his procedure to that of causal science.[1] It is contradictory in principle, for it exhibits no identity throughout the different stages of the process; it renders impossible the conception of experience as the development of one continuous function. But it is this latter principle, with the teleology that it involves, that has enabled Mr. Baldwin to reinterpret facts derived from psychology and sociology in a way that is significant for logic. The following out of this principle, however, is strangely crossed by and intermingled with an external 'scientific' explanation of experience in terms of the interplay of the organism with its physical and social environment.

That what I have called Mr. Baldwin's external mode of explaining logical experience is derived from Darwinism is still more evident from his presidential address entitled "Selective Thinking."[1] This paper is at once a program and an epitome of the work that he has since published in this field. Here the terms and conceptions are avowedly taken from biology, as is evident from the following statement of the problem: "Look-

[1] In a paper entitled "The Notion of the Implicit in Logic," which was read before the Philosophical Association at the Baltimore meeting, I have treated this point more in detail. This paper will appear during the present year in *The Philosophical Review*.

[2] Published in *The Psychological Review*, January, 1898, and reprinted in the volume *Development and Evolution*, pp. 238 ff.

ing at the question from a point of view analogous to that of the biologists when they consider the problem of 'determination' in organic evolution, we are led to the following rough but serviceable division of the topics involved — a division which my discussion will follow: (1) The material of selective thinking (the supply of variations); (2) the function of selection (how certain variations are selected out for survival); (3) the criteria of selection (what variations are singled out for survival); (4) certain resulting interpretations."[1] This formulation of the problem and the comparatively brief compass of the paper bring out clearly both the nature of the explanatory principles that he proposes to employ and also, I think, the ambiguity in the actual procedure to which reference has already been made. On the one hand, we are told that "it is just the nature of knowledge to be an organization, a structure, a system."[2] Variations are not fruitful "that do not fit into the coördinations of knowledge which are ours, nor bring about readjustments in the arrangement of them. The items, to appeal to me, must never quite break with the past of my knowledge: each must have its hand linked with that of the thought which begot it."[3] "The attention is a function of organization, a function which grows with the growth of knowledge, holds in its own integrity the system of data already organized in experience."[4] Moreover, Professor Baldwin points out that "the environment of thought can only be thoughts; only processes of thought can influence thoughts and be influenced by them. . . . Even in knowledge of the external world of signs, expressions, etc., we have to say that movement must be reduced to some form of thought in order to be organized in our knowledge."[5] In these and many other statements that might be quoted from the paper, the idealist recognizes familiar doctrine, and also that here fresh facts and illustrations are brought to its support. But the Darwinian conceptions, which play the main rôle, lead the author to 'genetic' results of the organization of knowledge which are

[1] *Development and Evolution*, pp. 238–239.
[2] *Ibid.*, p. 245.
[3] *Ibid.*, pp. 246–247.
[4] *Ibid.*, p. 252.
[5] *Ibid.*, pp. 260–261.

quite out of harmony with that indicated in the passages quoted. These are summed up in statements like the following: "Selective thinking is the result of motor accommodation to the physical and social environment; this accommodation taking place in each case, as all motor accommodation does, from a platform of earlier 'systematic determination' or habit."[1] "Thus organized knowledge in all its development may be looked upon as due to the *synergies* of motor process selected as accommodations to the world of things and persons."[2] This really amounts to a derivation, not merely of the contents of the mind, but of its organizing principles and categories from the control of the environment. Although we are told that 'the burden of mental progress seems to lie on the side of the organizing function,' that organizing function is itself derivative. "The individual's judgment, his sense of reality and truth . . . when genetically considered is both the outcome and the evidence of the control which the environment has all along exercised. Even though we assume certain innate norms of selection which the individual directly applies, still those norms must not only lead to workable systems of knowledge in the world of active experience, but they must also in their origin have been themselves selected from variations, unless, indeed, we go back to a theory of preëstablished harmony."[3]

It appears to me that it is necessary only to place such statements side by side in order to exhibit the difficulties of the position. Of course, Mr. Baldwin's view is that logical organization arises out of the earlier organization or platform of motor habits. But what is the principle of unity that holds together motor adjustments into an organization? What is meant by the 'synergy' or union of adaptive movements which is said to give unity and organization to the mental life? If we say that this is just the *consciousness* of the movements as related, do we not thereby imply that the unity and organization are involved in the very nature of consciousness? To form a system or platform,

[1] *Op. cit.*, p. 264.

[2] *Ibid.*, p. 265.

[3] *Op. cit.*, p. 266. It is interesting to note that here, as elsewhere, the alternative for Professor Baldwin is between deriving logical principles mechanically and *finding them existing a priori.*

the motor sensations must be interpreted, evaluated, or translated into terms of knowledge. Similarly, new motor accommodations cannot produce changes in this system. It is only thought which produces changes in the organization of knowledge. Attention is, indeed, in a sense 'action'; but can its function as the organizing principle of experience be adequately described in terms of what is 'motor, afferent, kinæsthetic'? And the Darwinian principles show their inadequacy in other respects. For thinking is not mere selection or elimination. Not only do the variations arise as differentiations of the achieved organization of experience at any stage, but they are linked to each other in such a way that they mutually define and determine each other. The variation finally chosen has itself undergone modification and determination through the process of elimination. Moreover, it is not simply added to the platform from which it arose, but enters into it as an organic member. In short, what we have is a living, organic process of internal transformation and growth to which no account in mechanical terms can do justice.[1]

The general result that we seem to have reached is that Darwin's conceptions can be fruitful for logic only when transformed in the light of an idealistic philosophy. When carried over directly into logic they furnish no really genetic or teleological principle of explanation, but throw us back on the mechanical and external categories which have already been tried and found wanting. Nevertheless, Darwin's work and method — infusing as they did new life into the psychological and historical sciences and opening up new problems and new fields of investigation — fortunately have not left logic untouched. Fortunately, for if logic is to fulfil its task of interpreting and exhibiting the principles of experience, it must rest upon the work of the physical and mental sciences, that 'first vintage' of truth, as

[1] In this attempt to trace out the influence of biological concepts on Mr. Baldwin's logical writings and to estimate their value, my criticisms have necessarily been stated somewhat summarily. The points involved are so fundamental that it is, of course, impossible to treat of them exhaustively or adequately in this incidental way. Readers of this REVIEW have, however, already had the main issues between idealistic and Darwinian logic ably presented on both sides in a notable discussion between Mr. Bosanquet and Mr. Baldwin, which was carried on in various numbers of this journal during 1902 and 1903.

Bacon might say. The vast accumulation of facts in various fields, and the new form of the results, offer fresh problems to logic and demand a new statement and interpretation from it. The new facts of biology, psychology, sociology, and history press upon logic for reinterpretation and revaluation in terms of experience. Not only will Hegel's work 'all have to be done over again,' as Green remarked; but logic, if it is to keep alive and fulfil its function, will have to be done over constantly and continuously by each generation in order to meet the new problems raised by the advance of the special sciences. There can be no doubt that the weakness of the Hegelian logic consists in the fact that its connection with psychological experience is not clearly and fully worked out. When we call to mind how comparatively little had been accomplished in the way of scientific analysis a century ago, either in physical science or psychology, we cannot but marvel at Hegel's achievement. That, working with such scanty materials, he was able to furnish an interpretation of experience whose essential features the advance of science has confirmed, is a striking evidence of his own profound insight, and of his ability to profit by the labors of his predecessors.

This work, however, must be done over again in the light of the new facts and laws that are furnished by science, and more particularly by the evolutionary sciences to which Darwin's discovery gave a new impetus and direction. It should be recognized that the movement known as Neo-Hegelianism constitutes an important step in this direction. That movement has succeeded in ridding itself of the formalism and abstractness that characterized Hegel's results, mainly by recognizing and making use of the new material that scientific analysis has brought to light, particularly in the field of psychology. The further reconstruction of logic that is urged by the pragmatists and Mr. Baldwin is undoubtedly made necessary by the discovery of facts of a new order, and most of all by the new conceptions under which the sciences are to-day presenting various aspects of experience. These writers have done good service, both by insisting on the need for a restatement of logic that shall take up into itself and serve as an interpretation of the psychological

sciences, and by their own positive contributions toward such a restatement. The criticism that I have tried to justify in the case of Mr. Baldwin is that he has sought to bring about this reconstruction by adopting to some extent the standpoint and working conceptions of biology and psychology. For it must never be forgotten that logic has not to take over either facts or conceptions from the special sciences. It is rather its function to reduce these facts to its own terms, to estimate their value and assign to them their meaning in accordance with its own standards. Darwin's evolutionary principles, being formulated as a mechanical explanation of the adaptations to be met with in organic nature, can have no direct application as an explanation of experience.

After all, is not the fundamental issue between Idealistic and Darwinian logic, simply the old question as to whether reason and purpose can be explained in terms of relations obtaining between phenomena, or whether these principles are not rather presupposed in all science and experience? If the latter be true, and *only* if it be true, are we entitled to employ teleology as an explanatory category of our experience. For the ultimate explanatory category of experience must be at the same time its universal presupposition. To work out and justify the connection between presupposition and final category is to complete the circle of experience, and so must mark out for logic the nature of its undertaking.

THE INFLUENCE OF DARWIN ON SOCIOLOGY.

BY PROFESSOR CHARLES A. ELLWOOD,
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It often happens in the history of science that the influence of a great thinker and investigator in one field penetrates to many related fields. It is not often, however, that the influence of such a man comes to dominate in other fields than his own. Yet this is undoubtedly what has happened in the case of Darwin; and perhaps in no field outside of his own is the dominance of Darwin's influence to be seen more clearly to-day than in sociology. John Fiske said that Herbert Spencer was the most eminent thinker that England produced in the nineteenth century: but although Spencer was primarily a sociologist, his influence in sociology is waning, while Darwin's influence is growing. When one reflects upon the immense influence which Darwin's work has had on practically all lines of human thought, and especially on the biological, psychological, and social sciences, one is forced to conclude that Fiske's estimate must be revised, and that Darwin must be given the seat of highest honor as the most fructifying thinker which the nineteenth century produced, not only in England, but in the whole world. And the social significance of Darwin's teachings is even yet only beginning to be apprehended.

Not that Darwin had any theory of his own regarding human society. Outside of a couple of chapters in his *Descent of Man* he says little specifically regarding the problems of human society; and it must be admitted that what little he says is not peculiarly valuable or profound, but only suggestive. In spite of the vast range of his mind and of his scientific labors, Darwin, then, was not especially interested in social problems and made no direct contribution to sociology. On the other hand, Spencer was primarily interested in social problems. His first considerable work, *Social Statics*, was along sociological lines,

while his whole synthetic philosophy was confessedly developed to support his social and political theories. Even in his famous controversy with Weismann Spencer admitted that social interests were influential in his defending the doctrine of the inheritance of 'acquired characters.' Thus Spencer's interest in other sciences was subsidiary, while throughout life he remained primarily a sociologist. Nevertheless, as was said above, it has come about that Spencer's influence in sociology is waning, while the influence of Darwin, who was not a sociologist at all and not even greatly interested in social problems, is growing.

The reasons for the decrease of Spencer's influence in sociology and the increase of Darwin's are not far to seek. Spencer sought his principles of social interpretation in the physical sciences, as his work on *First Principles* clearly shows. He aimed at explaining social phenomena in terms of the redistribution of matter and energy. While he found it impossible to carry out an interpretation of social life in these terms, his conception of evolution, and even of social evolution, remained mechanical to the last. Spencer's social interpretations, then, being fundamentally in terms alien to the social life, were fore-doomed to failure. Again, Spencer's social and political theories were largely based upon the ideas and prejudices of the average middle-class Englishman of his time; and his knowledge of biology and psychology did not greatly alter his social theories, but rather the latter powerfully influenced his biological and psychological views. Under these circumstances it is not surprising that many of Spencer's social theories were of a temporary character.

Darwin's methods, on the other hand, were totally different. We find in him no appeal to vague principles borrowed from the physical sciences; but on the contrary he attempts to explain the life-process in terms of its own elements. As is well known Darwin got the key to his natural selection theory of organic development from Malthus, a writer on social and economic problems. Malthus, in his sociologic study of the growth of population, demonstrated that the normal rate of reproduction in man is in some geometric ratio, and consequently, to use Malthus's own metaphor, nature invited more guests to her

banquet than she laid covers. Hence arose, according to Malthus, a struggle for existence in human society, in which the weaker succumbed to poverty, disease and death, while the stronger survived. Darwin seized upon this idea and generalized it, applying it to all organic nature and deducing therefrom his famous doctrine of the natural elimination of the inferior and the evolution of higher types through the 'natural selection' of the better adapted. It may be suggested that Darwin's principle of natural selection found ready acceptance in sociology because it was a principle which had already been recognized and applied, though in a negative way, in social theory. However, the deeper reason for the strong influence which Darwin's work has had upon sociology is probably the simple fact that his work was upon a part of sociology's foundations. Sociology, as a body of theory regarding the origin and development, structure and function of human society, could not develop until biology had developed. Spencer worked largely at rearing a sociological superstructure for which the necessary biological and psychological foundations had not been laid, while Darwin worked at these foundations. However much Darwin's selection theory of organic evolution may have to be modified by the biologists of the future, there is no doubt that his work established biology upon a secure scientific basis. The inevitable consequence has been that Darwin's work has reacted to enrich immeasurably all the sciences in any way connected with biology.

The greatest effect of Darwin's work on sociology has been of course in connection with the theory which is particularly associated with his name: the selection theory of evolution. While it is one of the moot points in biology just now whether natural selection operating upon minute variations even through immense periods of time is capable of producing new species, there has never been any doubt since Darwin wrote that selection is a powerful modifying influence upon all forms of life through its 'fixing' certain variations. In this sense Darwin demonstrated that selection is the chief creative force in the biological realm. Sociologists have not been slow to see that this idea had vast possibilities when applied to the interpretation

of the forms and movements of human social life. While none has succeeded in showing that natural selection is the key to social evolution, it has been repeatedly shown that natural selection conditions the social evolution process at every step; that natural selection is the basis, though not the moving force, of human progress. The competition between human groups, especially through war, and the resulting elimination of those of inferior organization or of inefficient membership, has been shown to be in past social history one of the chief causes of the continued advance to higher types of social organization. All the higher types of human coöperation may thus be said to be 'fixed' by natural selection quite in the same sense that the higher types of life are. In many other ways also natural selection has been shown to affect human society, especially, for example, in the way in which the death rate affects different classes or elements in complex human groups. So numerous have been the sociological writers who have applied the idea of natural selection to human society that it seems superfluous to mention any, but Gumplowicz, Novicow, Ratzenhofer, Ward and Kidd may be taken as types, though not all of these men have embodied consistently the Darwinian point of view. Indeed, but few sociologists have had with any exactness Darwin's point of view, while not a few, the so-called ultra-Darwinists, by grossly exaggerating certain elements in his doctrine, such as struggle, have brought discredit upon his whole theory. Nevertheless, sociologists are more agreed to-day than ever before that natural selection must be given an important place among the factors of social evolution.

But it is not natural selection alone which has occupied the attention of sociologists, but rather selection in all of its forms; and the impulse to the study of the effects of various forms of selection upon human society may be fairly credited to Darwin, since selection, though long known and practically applied, was first given by him its full theoretic significance in evolutionary science. It is especially social selection which has of late been attracting the attention of sociologists; that is, the effect of social institutions and customs upon the birth and death rates of various classes. Francis Galton, a cousin

of Darwin, led in his *Hereditary Genius* (1869) in this study of social selection, showing especially the evil effects of religious celibacy upon various European peoples. Darwin in his *Descent of Man* paid some attention to various forms of social selection, suggesting, among other things, that war produced a 'reversal of selection' (*i. e.*, a breeding from the least fit). This idea has been developed by numerous writers, among the latest of whom is the historian Seeck, who finds in Rome's constant wars, and the resulting elimination of her ablest and strongest men, the chief cause of the decline of Greco-Roman civilization. The selective effects of city life, of economic competition, of standards of living, of marriage customs and laws, of various forms of benevolence, have all received increased attention from students of human society in recent years, though much still remains to be done. Certain it is that in any theory of social evolution in the future the various forms of selection must be given an important place, and especially must mis-selection be emphasized as one of the chief causes of social decadence. It is to be regretted that in a matter of such vital human importance there is still lacking adequate scientific investigation of the working of various selective agencies in human society.

Here must be noted the important practical application of the selection theory which it is proposed to make in bettering social conditions. Francis Galton has spent the latter years of his life in organizing a new division of scientific philanthropy which he calls the science of 'eugenics.' He defines 'eugenics' as 'the study of agencies under social control that may improve or impair the racial qualities of future generations, either physically or mentally.' A 'Eugenics Education Society' has been organized in England, which, together with the British Sociological Society, conducts a vigorous propaganda in behalf of the new science. As yet little similar work has been attempted in the United States. However distant any extensive application of the principle of selection to the improvement of the human breed may seem to be, it is now acknowledged by all scientific students of philanthropy and scientific social workers that there is a biological element in the social problems of crime, pauperism, and other forms of degeneracy which is amenable

to control only through selection. The theory of evolution by selection, in other words, has brought a great hope into the world that human misery in its worst forms may itself be subject to control. While sociologists will doubtless continue, as they have done in the past, to emphasize the all-importance of education, the nurture of each individual life, they will in the future have to take into account the possibility of improving nature also through the selective control of heredity. It may well be that future ages will look back to Darwin as marking, not merely a new view of organic nature, but a turning point in the history of the race in its control over human nature and over the problems of collective human life.

Sociology owes much to Darwin also in indirect ways, through the influence which his work has had in developing other sciences than biology, especially psychology. Sociology is not merely an extension of biology, as this paper has, perhaps, thus far seemed to imply; it is even more a psychological interpretation of the social life. Whatever has contributed to the development of psychology, therefore, has contributed to the development of sociology. Now the influence of Darwin upon psychology, which is discussed in detail in another paper in this number, may perhaps be summed up by saying that it tended toward a functional view of the mental life. Darwin's whole view of life was essentially functional. Everything about an organism, barring perhaps its accidental variations, had a meaning with reference to the whole life-process. The color and form of plants and animals, for example, Darwin sought to show, had a survival value for the species to which they belong. This view he carried over to the mental and moral characteristics of man. Hence has arisen the functional psychology of the present, which regards mental life as a part of the whole life-process and interprets it through its function in that process. This view is now practically dominant in psychology, and is rapidly transforming sociology also. The details of this transformation, which is now going on, cannot be here discussed, but it is evident that a sociology based upon a functional view of human nature will be a very different sort of affair from a sociology based upon a static view of human nature. And all this is undoubtedly a remote effect of Darwin's work.

Finally, the great debt of sociology to Darwin, as of all the sciences, is that he finally established the doctrine of evolution upon a secure foundation. That doctrine, in one form or another, had long been before the intellectual world, but it had failed of general acceptance until Darwin wrote. In the social sciences, it is true, the conception of social evolution had long been common. The idea of progress in human history, first put forth in modern times by Bodin, had been made the central idea in social philosophy by Condorcet. And Comte had even divided sociology into two parts, one treating of the laws of social progress and the other of the laws of social order. Still the idea of evolution, in its broader aspects, was insecurely held in the social sciences and not generally accepted until Darwin wrote. Darwin's work, then, wrought a revolution in the social sciences as well as in other sciences. His influence established in them the genetic point of view, so that sociology came to throw the emphasis, as it does to-day, upon the study of social changes rather than of social structure, making it a science of social evolution rather than merely a science of social organization.

DARWIN AND EVOLUTIONARY ETHICS.

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It is opportune that while we are honoring Darwin for his far-reaching influence in almost every field of modern thought we should consider his relation to ethics. The power of his name is being used in support of policies and doctrines which he certainly did not favor in his writings, and which there is no good reason to think he would approve to-day. Speaking of the general reaction against humanitarianism which shows itself in so many forms to-day Mr. Hobhouse says that "the doctrine that human progress depends upon the forces which condition biological evolution has in fact been the primary cause of the reaction. Darwin himself, indeed, was conscious of the limitations of his own hypothesis . . . " but "what has filtered through into the social and political thought of the time has been the belief that the time-honored doctrine 'might is right' has a scientific foundation in the laws of biology. Progress comes about through a conflict in which the fittest survives. It must, therefore, be unwise in the long run . . . to interfere with the struggle. We must not sympathize with the beaten and the weak, lest we be tempted to preserve them. The best thing that can happen is that they should be utterly cut off, for they are the inferior stock and their blood must not mix with ours." Darwin himself certainly held a very different doctrine.

As has often been pointed out there are two distinct aspects of the relation between ethical theory and evolution, which have been termed respectively the 'evolution of ethics' and the 'ethics of evolution.' But historically, origin and validity have been persistently and almost inseparably connected. To show that a law is not binding, prove that it is a recent, or 'artificial' construction. To give a strong force to custom, say that 'it is not of yesterday or to-day but lives forever, and none knows whence it sprang.' In both ancient and modern times the

question as to the origin of law or justice or current moral valuations has been forced to the front in times of conflict over the authority of institutions and customs. Such a situation called out the varying theories of the Greek enlightenment and the serious efforts of Spinoza and Hobbes, Locke and Rousseau. But whereas interest in the ancient world confined itself for the most part to the more objective questions as to the origin of institutions which likewise formed the initial question for modern reflection, the growing importance of the individual has brought increasingly to the front the more subjective problem: How does the moral consciousness arise? Is it an 'intuition' or 'sense' implanted once for all in human nature and incapable of further analysis? Or is it a product of gradual formation which can either be analyzed into simpler elements bound together by association or traced back historically to social forces? These are questions quite analogous to the general alternative between special creation of separate species or that continuity which Darwin maintained as his first premise.

The early evolutionary theories of morals were on their face primarily designed to condemn or approve the existing standards and institutions, and only incidentally as scientific accounts. Polus in the well-known passage argues that Might is Right by nature's law, and that all existing judgments to the contrary are a *Sklavenmoral*, set up by the weak, and gradually accepted by members of other classes who are 'charmed' from early youth by the suggestions emanating from dominant influence. Or again, what is 'stronger, freer, and more masterful,' is admired when it does not infringe too strongly on the interests of others; hence the interest of the stronger is really the basis of all law and 'justice.' Democrats and aristocrats make laws and shape institutions each for their own interest. Our *καλοκἀγαθοί* are 'honorable' and 'excellent' from the standpoint of their own class; but this is because "Nomos is lord of all."

On the other hand, if it is desired to strengthen respect for existing codes, reverence and a sense of justice are attributed to a primeval gift of the gods, designed to make associated life possible and thereby afford man protection against wild beasts — aid in the struggle for existence. Or by Aristotle with a preg-

nant reversal of standpoint, nature is to be sought not in the beginning, but in the perfected realization of powers. The process of social and moral evolution begins with impulse (ὁρμή) to the life in common, but the increasing organization of society gives increasing opportunity for human powers. For though in complete development man is the noblest, yet without the conceptions and the practice of justice and the excellence for which organized society is necessary "no animal is so unscrupulous or savage, none so sensual, none so gluttonous." This doctrine, then, equally with the opposing theories sought a standard in 'reality,' in evolution. But in its intent it looked forward, not backward, to a social intelligence and not to a physical force. Nevertheless, it is obvious that the conception of a law of nature as universal in human institutions and innate in the human soul could easily become in legal doctrine a ground for justifying institutions as they now are.

The reason why 'nature' appealed so strongly to the Greek was not biological. He did not trouble himself particularly as to the future of the race. Professor Dewey has recently stated forcibly why nature was such a word to conjure with:[1]

"What, finally, is this Nature to which the philosophy of society and the individual so bound itself? It is the nature which figures in Greek custom and myth; the nature resplendent and adorned which confronts us in Greek poetry and art: The animism of savage man purged of grossness and generalized by unerring æsthetic taste into beauty and system. The myths had told of the loves and hates, the caprices and desertions of the gods, and, behind them all, inevitable fate. Philosophy translated these tales into formulæ of the brute fluctuation of rapacious change held in bounds by the final and supreme end: the rational good. The animism of the popular mind died to reappear as cosmology."

We find the evolution of morality and the law of nature the center of discussion once more at the opening of modern thought. A Falstaff might flippantly appeal to biology to justify his predatory designs upon Justice Shallow: "If the young dace be a bait for the old pike, I see no reason in the law of

[1] Ethics, Columbia University Lecture, 1908.

nature but I may snap at him." But Hobbes wished to establish a firm basis for government by showing the brutishness of a 'state of nature,' Spinoza to point the way of escape from 'human bondage.' The striking thing about these attempts is the discredit which has now fallen upon the natural. One school of writers, indeed, maintains the rational and social nature of man, and the rational laws of cosmic nature, but the most striking evolutionary theories, those of Hobbes and Spinoza, conceive nature as the realm where force, and the instinct for self-preservation hold sway. This was doubtless due largely to the theological dualism between the 'natural man,' born in sin, totally depraved, with no good instincts, and the spiritual man who must needs be 'born again,' regenerated by special divine grace, before he could be just or good.

In the case of such a writer as Hobbes, very likely a reenforcement to the dualistic attitude came from the horrors of war which seemed to disclose the primitive passions of man when unchecked by the barriers built by law and government against them. In Spinoza's case there was a metaphysical reënforcement. For although it is the very essence of substance (or God) that involves existence and persistence and becomes in man the 'endeavor' for self-preservation, yet as 'the force whereby a man persists in existing is limited,' and as he is thus necessarily 'a part of nature' and 'passive,' "it follows that man is necessarily always a prey to his passions."

The forces adduced by the writers who sought to bridge the chasm without appealing to supernatural agency were various. The view of the world and life *sub specie æternitatis* in which Spinoza saw the only relief from human bondage made the saved as few as the elect of Calvinism. Nevertheless, the measure of reason which men in general have is sufficient to lead them to seek greater power and advantage through union in the civil order. Man perceives his need of his fellow men and in this sense may be called sociable. Hobbes dwelt upon the fear which drove men to political life and legal morality. Mandeville introduced pride and susceptibility to flattery as affording the agencies on which superior classes could work in fastening the 'slave morality' (to borrow Nietzsche's phrase)

upon the inferior class — thus "savage man was broke." It was avowedly against the supposedly evil effects of such a nominalistic and selfish theory of morals as that of Hobbes that the evolutionary theories arose which claimed a continuity in moral development.

The 'herding instinct,' the 'seed of a boniform nature,' the instinctive disgust or recoil from what is 'nasty,' the 'moral sense,' of Shaftesbury and his school all reflect this standpoint. The optimism of 'natural religion' (the term itself was an abomination from the previous standpoint as to the wickedness of the natural), the era of comparative peace, the increase of commerce and general intelligence, all favored the spread of the conception of historical and psychological continuity in the moral process. Hume was able to effect a synthesis of the claims of reason and instinct in the rise of society and justice. Sex instinct starts the process and brings pairs together. The advantage of society when once experienced is then consciously appreciated. A civil order which included justice is 'artificial.'

Emancipated from unquestioning acceptance of the authority of the Church and the Leviathan, the individual was moved to examine the nature and origin of the inward authority which was replacing external control. If conscience has the right to govern the world how is such a right derived? The rationalist account of the 'moral faculty' did not lend itself easily to evolutionary treatment. Reason tended to be conceived mathematically or logically. It was 'timeless,' 'universal and necessary.' Kant, indeed, in his essay on political evolution for once seems on the verge of a very different conception. Men's passions and conflicting impulses call out a civil order and evoke a reason to recognize its values. And the later German idealism foreshadowed, at least, if it did not clearly grasp, the conception of an evolution of reason. But it was the 'moral sentiment' which lent itself most easily to genetic treatment whether by the associationist analysis of Hartley or by the brilliant beginnings of social psychology in Adam Smith.

The 'validity' of a moral sentiment was not necessarily threatened by considering it genetically. But when the process was conceived hedonistically, as an association of pleasurable

elements, it was difficult to ascribe to the product any greater authority than that of any other pleasurable feeling. If my moral sentiment gives me pleasure in a generous act, well; if I find more pleasure in an egoistic act, who can say me nay? If it is a matter of individual association, why is my liberty judged by another man's conscience? J. S. Mill, as he tells us, felt in his own experience the artificial character of the theory, and in the 'Utilitarianism' took two important steps toward a more adequate conception. On the one hand, the 'social feelings' took on the form of an active 'natural want' rather than of an association of pleasures. On the other hand, he considered that first the social state, so natural, so necessary and habitual, and then the necessity of coöperation with others and of proposing 'a collective, not an individual interest' were agencies in bringing about the social feelings. It wanted but an additional step to disclose the individual as a 'social outcome' rather than as a 'social unit,' but this was a revolution for which the time was not ripe.

The social explanation through Sympathy, begun by Hume in hedonistic terms and developed along broader lines by Adam Smith, cast no discredit upon the product for a generation which valued the social. Not until race collisions, class contrasts, and the clashing of ideals of a new era had set up as morally desirable a sharp antagonism between the 'higher' and 'lower' races, between the 'fit' and the 'masses,' between the 'solitary' and the 'herd,' did sympathy become a synonym for weakness, and come to be regarded as fatally infecting the moral sentiment it had aided in producing.

The great contribution of Spencer was that he placed moral evolution — both moral progress and the formation of moral sentiments — in the sweep of his universal process. We may easily criticize his hedonistic analysis of the 'moral sense,' or, from another point of view, his belief that he has reconciled the empirical and *a priori* schools of thought by his doctrine of the experiences of the race. We may smile at his derivation of the consciousness of duty, and from our present standpoint of social psychology detect the fallacies of his atomistic conception of the individual in group life. We may think that his appeal to evo-

lution in the *Social Statics* is rather to confirm a doctrine of potitical ethics already established on other grounds. The fact remains that he had conceived a world-wide movement. Mental and moral and social evolution gained immensely in their significance and definiteness when placed under a law asserted also of all the inorganic and organic world. And as compared with the great evolutionary conceptions of German idealism, the great advance in the natural sciences and the relative simplicity and clarity of their concepts gave Spencer a great advantage in power of appeal, even if this very simplicity inevitably brought it its own limitations for the explanatory principles so derived. Applied to morality the principle of adaptation makes "moral progress not an accident but a necessity. Instead of civilization being artificial it is a part of nature, all of a piece with the development of an embryo or the unfolding of a flower." For "all evil results from the non-adaptation of constitution to conditions"; but it is an essential principle of life that non-adaptation is ever being rectified until the adaptation is complete. Man's primitive predatory life required sacrifice of the welfare of other beings to his own, and his unfitness for present society is due to a survival of these traits formerly necessary.

The wide-reaching influence of Darwin upon ethical theory was not so much by his own discussion of the moral sentiments in the *Descent of Man*, as by the general biological and logical principles of his *Origin of Species*. The question was soon raised as to the operation of natural selection in the social and moral sphere. No evolutionary theories had brought home so vividly the continuity of the whole organic world. None, therefore, had seemed to immerse man so deeply in nature, and make him merely one link in a chain all forged of one metal and in one fire. Before Darwin's own discussion of morality in the *Descent of Man* numerous important contributions appeared. Among those which Darwin cites as most directly in the line of his problem were those of Wallace, Galton, Bagehot and Greg.

It remained for Darwin to approach the problem 'exclusively from the side of natural history,' and 'as an attempt to see how far the study of the lower animals throws light on one of the highest psychical faculties of man.' The general lines of Dar-

win's theory are indicated largely by this standpoint and by the fact that the dominating English tradition of his time sought the distinctive character of the moral in the emotional rather than in the rational factor. His proposition is "that any animal whatever, endowed with well-marked social instincts, the parental and filial affections being here included, would inevitably acquire a moral sense or conscience, as soon as its intellectual powers had become as well, or nearly as well developed, as in man."

The four steps in the development are the following: (1) The social instincts lead to pleasure in society, to sympathy, to aid. (2) With the rise of memory, pains due to unsatisfied instinct would arise when the more enduring social instincts had been overcome by some temporarily stronger desire. (3) The common opinion of a group, expressed in language, and appealing to the love of approbation due to sympathy, would become paramount as a guide. (4) These factors would be reënforced by habit.

The weak points in the scheme as worked out are due largely (1) to conceiving the moral consciousness too exclusively in instinctive and emotional terms. There is no reference to the part of choice in building up a moral agent. Thought or reason appears in it chiefly in the guise of memory and there is but a hint at an intelligent forecasting of the future, and weighing of values with reference to a purpose or end. There is thus little thought of a self, and the crux of the problem takes the form of setting 'the more *enduring* social instincts' over against the more transient gratifications of bodily appetite or selfish desire. To throw the whole burden of the consciousness of duty on the single precarious support of the greater 'persistency' in consciousness of the social *instincts* would scarcely be possible for one who had read in ethics as thoroughly as Darwin had studied in the organic field.

The second weakness is of a very different sort, and one which all psychology shared until recently. The individual is conceived to a large degree as the unit, endowed to be sure with social instincts and sympathy which make him responsive to public opinion, but not social in the deeper sense which

present psychology is working out and which, it is fair to say, carries out with far more adequate analysis the line of thought which Darwin did much to promote.

For the strong point in Darwin's method of approach was first that it gave to the whole theory of moral evolution a concrete setting in a process which was both broadly conceived and definitely evidenced, and secondly that it gave a much broader basis for the social nature of man than had usually been given by those who had considered man apart from animal life. The examples of mutual aid as well as of instinctive craving for the company of other animals of the species gave a fuller content to the term social, while his long study of animal instincts doubtless kept Darwin from becoming entangled in the hedonistic psychology by which English writers had so often been led astray. It is indeed a striking illustration of Darwin's independence and sagacity that he escaped the common fallacy on this point although, as he says, all the authors whom he had consulted, with a few exceptions, held to the hedonistic theory.

A point of greater present interest because it lies much closer to the question of moral standard is the question how far natural selection is an important factor in the growth of morality and the moral sense. On this point Darwin regards his own discussion as 'imperfect and fragmentary.' As already noted many writers in the period which had elapsed between the *Origin of Species* and the *Descent of Man* had broached this question. Wallace had pointed out that although man would be little liable to bodily modifications through natural selection his intellectual and moral faculties would be both variable and highly important, hence there would be a field for natural selection. Bagehot's *Physics and Politics* originally published in 1867–1869 has as its secondary title, *Thoughts on the Application of the Principles of Natural Selection to Inheritance and to Political Society* and is in many ways the most brilliant discussion of the subject which has appeared. This as is well known had emphasized the necessity of coherence, of obedience and law, of the 'cake of custom,' as fundamental elements of strength. 'The frame of their morals' must be 'set by long ages of transmitted discipline' before there can be individual

liberty or general freedom of intercourse. There are also other virtues which are selected by conflict. The military virtues may be said to be the 'preliminary virtues.' On the other hand, Bagehot points out forcibly the defects of the selection which depends upon war. "Humanity, charity, a nice sense of the rights of others, it does not foster." Contempt for physical weakness and for women which mark early society are survivals. So too are the metaphors from law and war which make most of our current moral phrases and frequently vitiate what they illustrate. Military morals exaggerate action and discipline, and place too little value on meditation.

Darwin emphasizes the survival value in primitive life of sympathy, fidelity and courage. He points out, however, that within a specific group natural selection would frequently work to preserve those less virtuous rather than the more faithful and courageous. The primitive instinct would be gradually reënforced by purposive aid performed at first from selfish motives. Habits of performing benevolent actions would strengthen a feeling of sympathy and "habits followed during many generations, probably tend to be inherited." A more powerful stimulus to social virtue, however, is the praise and blame of fellow men, and this also rests ultimately on sympathy. With 'an increase in number of well endowed men and an advancement in the standard of morality,' there will be an 'immense advantage' to one tribe over another. "A tribe including many members who from possessing in a high degree the spirit of patriotism, fidelity, obedience, courage and sympathy, were always ready to aid one another, and to sacrifice themselves for the common good, would be victorious over most other tribes; and this would be natural selection." With civilized nations, on the other hand, "natural selection apparently effects but little." "The causes which lead to the advance of morality are rather the approbation of our fellow men — the strengthening of our sympathies by habit — example and imitation — reason — experience, and even self-interest — instruction during youth, and religious feelings."

Noteworthy because of its significance for the present 'reaction,' and especially in view of Nietzsche's denunciations, is

the stress which Darwin lays upon sympathy. "Nor could we check our sympathy, even at the urging of hard reason, without deterioration of the noblest part of our nature. The surgeon may harden himself whilst performing an operation, for he knows that he is acting for the good of his patient; but if we were intentionally to neglect the weak and helpless it could only be for a contingent benefit, with an overwhelming present evil. We must therefore bear the undoubtedly bad effects of the weak surviving and propagating their kind."

As we have said, Darwin's own interpretation of the moral standard is not that currently associated with 'Darwinism.' The conception of a purely mechanical process, excluding all 'norms,' is what some find in the evolutionary process as Darwin conceived it. The supreme value of force or might is the lesson which others read in the same process. This makes strength the only virtue and weakness, of which sympathy is a fellow, the only unpardonable sin. A third conception is derived from the process viewed as a series of advancing types. If each lower type finds its meaning in serving as a means for producing a higher type, then man is no longer to be viewed as 'end in himself.' His end is rather to produce the 'Uebermensch.'

We cannot, of course, discuss these theories within the limits of this paper. As to the first, it is sufficient to remark that values are, of course, not to be sought in a process conceived as 'natural' in a sense which excludes self-conscious valuation. To suppose, on the other hand, that the 'mechanism' which 'governs' in nature excludes the possibility of a consciousness that could be 'normative' would be to interpret the 'continuity' of nature in a way to exclude totally all variation. To appeal to a logical value in urging the truth of the doctrine of mechanical evolution, and to use this appeal to deny all ethical valuation is a thinly disguised contradiction. The fundamental points at issue in the other questions are: (1) Granted the evolution of ethical values, has the process been so uniform and continuous that in seeking guiding principles for life it makes no difference what part of the process we consult? To affirm that such must be the case would be again to give no place to variation. It

was the merit of Huxley to point out epigrammatically the difference between the 'ethical,' consciously directed process, and the 'cosmic' process prior to conscious activity. (2) Is the valuation of every man as 'an end,' with the corresponding implication of sympathy, an inherently suicidal moral principle? Will it, if followed, inevitably destroy all moral values by destroying all the more valuable strains and races? That there may be developed a science of eugenics is certainly a consummation devoutly to be wished, but until our civilization corrects some of the gratuitous evils which it now opposes to progress, until it plans dwellings, education, and conditions of work so as to remove the obstacles it now opposes to health and strength, it would seem that the obvious lines of effort were close at hand. For Europe and America to remove the degeneration due to poverty and disease among their own peoples would seem a more hopeful agency of progress than the exploitation of weaker races, and if the 'superior' will not continue their own stock, what will it profit to forbid the inferior to continue theirs? It would indeed be contrary to the implications of the evolutionary method to deny the possibility of new variations, of different standards. But if there is to be any standard at all it must be based on a common good. And if this is abandoned, moral values will not be endangered; they will have already disappeared.

THE INFLUENCE OF DARWIN ON THEORY OF KNOWLEDGE AND PHILOSOPHY.[1]

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I.

Under the headings of 'instrumental' and 'genetic' logic[2] the evolution theory has worked its way into the discussion of the higher processes of thought. The theory that thought is an instrument for dealing with social and practical situations — for solving problems of adjustment and truth — has given to discussions of knowledge and reality a new and vital interest. All knowledge remains experimental until it is confirmed, and it can be confirmed only by a resort to trial in the domain of its appropriate application. This leads up to two very important positions in the newer logic: a view as to the nature of truth on the one hand, and a view on the other hand as to the nature of the 'laws of thought,' the so-called categories or 'schemes,' in which the mind builds up and systematizes its acquisitions.

The theory of truth becomes either one of extreme 'Pragmatism' or one at least of 'Instrumentalism.'

Instrumentalism holds that all truth is tentatively arrived at and experimentally verified. The method of knowledge is the now familiar Darwinian procedure of 'trial and error.' The thinker, whether working in the laboratory with things or among the products of his own imaginative thought, *tries out* hypotheses; and only by trying out hypotheses does he establish truth.

Here Darwinism gives support to the empiricism of Hume and Mill and forwards the sober British philosophical tradition. And no one illustrates better than Darwin, in his own scientific method, the soberness, caution, and soundness of this procedure.

[1] Abstract of part of a paper on 'Darwin and the Mental and Moral Sciences' prepared by request for the Darwin Celebration of the American Philosophical Society.

[2] See Dewey, *Studies in Logical Theory*, and Baldwin, *Thought and Things or Genetic Logic.*

Scientific method, therefore, becomes, when the full implications of the matter are thought out, the exhaustive epistemological method; that is, we must hold that there is no method of reaching results to be called truths, which is not found, when genetically considered, to go back to the fundamental processes of experimentation. There is no royal road to truth; no golden rule of revelation or inspiration by which the philosopher can deduce the 'universe and the contents thereof.' The ambitious *Naturphilosophie* of the last century remained barren and speculative until, through the development of experimental and evolutionary science, it became *Naturwissenschaft*.

But what shall we say of the principles of knowledge itself? Are there no final *a priori* and absolute tests of truth such as we are accustomed to find in 'identity,' 'consistency,' and 'sufficient reason'? Are there no constructive categories which do not themselves owe their establishment to experiment?

As to the categories — here again instrumentalism has its adequate reply; and its reply is strictly Darwinian. These, too, it replies, the categories, are principles which have been saved from numberless possible variations of thought in the course of racial evolution. They represent selections, adjustments to the natural situations which have confronted the mind. They are rules of systematization found useful for thought and experience, for individual knowledge and practice, and for common social belief in the vast stretches of history. The mind has built up a structure, as the body has; and by a similar method: that of tentative and experimental adjustment, followed up by the correlated organic structure fixed by selection.

It is here that Herbert Spencer's most valuable intuition appears—a conception to be placed beside that of Darwin's. The weak point in Spencer's harness, however, was his resort to Lamarckian inheritance for the fixing of the rib-structures of mind. But for the theory of knowledge, the result is the same. The most absolute and universal-seeming principles of knowledge, viewed racially, are 'practical postulates' which have been woven into human thought as presuppositions of consistent and trustworthy experience. They were 'original ideas' at some time, found to be useful for the organization of knowledge and

for the conduct of life; and, now, by processes of reflective abstraction, they are set up as schemes or forms divorced from the concrete contents which alone gave them their justification and value, and called 'the Categories.'

So far we may recognize the two great conquests of the instrumental or experimental logic. It holds that *all truth is confirmed hypothesis*, and that all *reason is truth woven into mental structure*. These two great formulations are handed over to philosophy. Both are Darwinian. The first cites the selection of ideas for their utility in the individual's development; the second cites the 'coincident' racial selection that fixes them in the constitution of the mind.

But a more radical point of view is possible. What is now known as pragmatism proceeds out from this point. It is pertinent to notice it here, for it offers a link of transition to the philosophical views with which we must briefly concern ourselves.

Pragmatism[1] turns instrumentalism into a system of metaphysics. It claims that apart from its tentative instrumental value, its value as guide to life, its value as measured by utility seen in the consequences of its following out, truth has no further meaning. Not only is all truth selected for its utility, but apart from its utility *it is not true*. There is no reality then to which, whether humanly discovered or not, truth is still true; on the contrary, reality is just and only the system of beliefs found useful as a guide to life.

I wish to point out that, in such a conclusion, not only is the experimental conception left behind, but the advantages of the Darwinian principle of adjustment to actual situations, physical and social, is lost; and if so interpreted instrumentalism defeats itself. This appears as soon as we analyze any situation involving trial and error. Trial implies a problematical and alternative result: either the success of the assumption put to trial or its failure. When we ask why this is so, we hit upon the presence of some 'controlling' condition or circumstance in

[1] The authoritative exposition is James' *Pragmatism*. I do not hold the author, however, or any other one writer to the statements made in my text in exposition of this chameleon-like theory. My full criticism may be found in the article 'The Limits of Pragmatism,' PSYCHOLOGICAL REVIEW, Vol. XI., pp. 30 ff.

the situation — some stable physical or social fact — whose character renders the hypothesis or suggested solution either adequate or vain, as the case may be. The instrumental idea or thought, then, has its merit in enabling us to find out, to locate, facts and conditions which are to be allowed for thereafter. These constitute a *control* of knowledge, a system of things discovered. Now we may, indeed, say that nothing of what we think can be considered real except what has been actually discovered; but we cannot go on to say that it is the discovery that makes it real. For if that were true what account could we give of this painstaking and often most laborious process of gradual correction and proof? — what account, that is, of the 'control'?

I know there are ways of replying to this criticism — ways of reducing the environment and its controlling facts to the level of postulates of earlier personal or racial experience. But while not finding these replies effective, I may simply say — confining the discussion to the Darwinian text — that the method of selection by trial and error requires that relatively greater stability, fixity and permanence be in the 'control' conditions, in the environment, and finds the genesis of truth in the gradual checking off of hypotheses under this more stable control. This supports instrumentalism, but it does not support pragmatism. I may 'bring about' reality apparently without this external control, by 'willing to believe' in something for which I have no proof or reason, in cases in which the sort of event willed — as for example, some one's else conduct — may be conditioned upon my act of will. But nature does not take to suggestions so kindly. The will of a general may stimulate his troops and so bring to him the victory he believes in; but such an act of the general's will cannot replenish the short supply of powder or shells, on which the issue of the battle perhaps more fundamentally depends.

In one other respect the newer view is transforming the theory of knowledge, a respect in which it shares with political and social science the impulse of Darwinism. I refer to the point of view from which the unit of knowledge, as of practice,

is no longer to be found in an isolated and self-regulating individual. Covering both the logical and the political aspects of the topic by the single term 'Community,' I may discuss the topic under that heading.

Community.[1] Work in social psychology has greatly modified the notion of the individual. The individual is found to be a social product, a complex result, having its genetic conditions in actual social life. Individuals act together, not alone — collectively, not singly. In short, the selective processes that have molded the individual, both racially and in his personal development, have turned on collective utilities. When interpreted in the political sciences this discovery shatters, at one blow, the historical theories of individualism, which make such motives as personal contract, individual competition, etc., the fundamental springs of human conduct, in its social relations, and the sources of government. Instead of a social contract, there is a social growth; the only contract is the one-sided one that assigns the too-individualistic thinker or actor to the jail or the asylum. Instead of government only with the 'consent of the governed,' we have government by the few or by the many *with or without* the consent of the rest. In this, and in the more 'socialized' view of social competition and rivalry, and in the new view of social transmission considered as a process which largely replaces physical heredity, both in its content and in its method, we find summed up the enormous debt that political science, together with the other social sciences, owes to researches carried out in the spirit of the selection theory.

In the theory of knowledge the same general truth appears, and it is for this reason that I place the two cases together. In the social sciences and in the theory of knowledge 'community' or some equivalent term is henceforth to be the watchword.

In the theory of knowledge it appears in the social reference that all knowledge implies. It is now the problem to find any knowledge that is psychologically private, not to find knowledge that is common and public. Individual judgment

[1] The two sorts of 'community' indicated in what follows are worked out by the present writer in detail elsewhere; that of the social life in *Social and Ethical Interpretations* (4th ed., 1906) and that of knowledge, in *Thought and Things*, Vol. II.

and sentiment is everywhere rooted in social life — in education, tradition, convention — and it becomes a problem of knowledge, as it is of ethics, to show how it is possible to 'be a Daniel,' and 'to stand alone.' The result is that the subjectivistic theories of knowledge, like the individualistic theories of political science, are soon to be laid away in the attics where old intellectual furniture is stored. The knower does not start out in isolation and then come to some sort of agreement with others by 'matching up' his world of independent sensations and cognitions with theirs. On the contrary, he starts with what his and his neighbor's experience in common verify, and only partially and by degrees does he find himself and prove himself to be a relatively competent independent thinker. The theory of the 'communities' or *common validities* of knowledge, and that of the corresponding 'communities' or *common interests* of society, is our new possession; and we owe them to the genetic researches which the Darwinian spirit and method have inspired.

II.

In coming to a conclusion as to the influence of Darwin's thought on philosophy, we should first sum up the general results of Darwinian views in the different branches of knowledge with which philosophy deals. If we look upon philosophy as many do as simply the broadest and most unified view that we can get of the world as a whole, it is evident that our task will be to set together the results of the more partial disciplines, the results reached, that is, by the sciences of fact and value. This leads to the body of theory embraced by philosophy. Accepting this as a general statement of the problem of the content or matter of philosophy, a second great question remains in the determination of philosophical method. I shall take up the latter question first.

Philosophical Method. In an earlier address, in which the history of psychology was briefly outlined,[1] I took occasion to point out that an epoch in the progress of that science was inaugurated with the absorption of Darwin's point of view; and

[1] Address prepared for the St. Louis Congress of Arts and Science, printed also in the PSYCHOLOGICAL REVIEW, Vol. XII., pp. 144 ff.

this because a revolution was produced in psychological method. Psychology has always been the vestibule, as it were, to philosophy, and advance in the latter never gets far beyond that of the former. So when psychology adopted seriously a naturalistic and positivistic method — the method, that is, of the positive sciences of nature — philosophy had also to recognize the generality of these points of view. Philosophical truth, like all other truth, must be looked upon as truth about nature — the nature of the world and the nature of man — and its progress is secured through reflection exercised under the control of the positive instruments and methods employed in those subjects. Purely deductive, speculative and personal systems of philosophy may be useful as gymnastics and profitable as sources of individual fame; but the genuine progress of philosophy is to be looked for only through those methods of confirmation and proof which control the imagination and permanently satisfy the logical and other demands of common reflection. There may be different philosophies, but like rival scientific hypotheses, each must show the array of facts, aims, motives, values, etc., that it can explain better than any other.

In these directions Darwin has strongly influenced modern philosophical thought; so strongly that the historical issues of philosophy have taken on new forms, which, in the new names now in vogue to describe them, are unfamiliar to the old-school philosophers. Instead of the problem of 'design,' we now have discussions of 'teleology'; instead of the doctrine of 'chance,' we now have the 'theory of probabilities'; instead of 'fatalism' and 'freedom,' we now have 'determinism' and 'indeterminism' variously qualified; instead of 'God,' we hear of 'absolute experience'; instead of 'Providence,' of 'order' and 'law' instead of 'mind and body,' of 'dualism or monism.' Not that all this shifting of emphasis and change of terms are due to Darwin; but that they are incidents of the newer antitheses current since the mind has been considered as subject to 'natural law,' and the world, including God and man, as common material for science to investigate. Scientific naturalism and positivism are methods of unlimited scope; and the

question of philosophy is, what does the whole system of things, of external facts and of human values alike — when thus investigated — really turn out to mean?

I may illustrate this by considering in more detail a central problem — one common to biology and psychology alike, and one whose answer colors the whole of one's philosophy. It is the old problem of 'design' debated in biology under theories of 'special creation' and 'chance,' and now discussed, alike in biology and psychology, in the form of questions of 'vitalism' and 'teleology.' In what sense, if any, is the world — and in it, life and mind — an ordered, progressive and intelligible whole? And if it is such in any sense, how did it become so? Is it due to intelligence? — and if so, whose intelligence? The most violent controversies aroused by the publication of the *Origin of Species* were let loose about this question. Darwin's opponents said 'chance,' 'fortuitous or spontaneous variation,' was to take the place of Providence, intelligent creation, God. If there be no rule of selection and survival save that of utility, and no source of the useful save the overproduction of chance cases, where is the Guiding Hand? Does not Natural Selection dispense with a ruling Intelligence altogether?

We have only to realize the present-day statement of this problem to see the enormous range of concession to naturalism the theory of Darwin has forced. Instead of 'chance' in the sense of uncaused [1] accident we now have the notion of 'probability,' a mathematically exact interpretation of what is to superficial observation fortuitous and capricious; and instead of an interfering Providence, we have universal order born of natural law. And it is within such conceptions as these, *now taken as common ground of argument*, that the discussion of teleology is conducted. The world is no longer thought of as a piece of mosaic work put together by skilful artificers — as the old design theory looked upon it — but as a whole, a cosmos of law-abiding and progressive change. A philosopher who knows his calling to-day seeks to interpret natural law, not to discover

[1] Darwin himself described 'spontaneous variation' in these words (*Descent of Man*, ed. cit., p. 49): 'provisionally called spontaneous, for to our ignorance, they appear to arise without any exciting cause.'

violations of it. The violations, if they came, would reduce the world to caprice, chance and chaos, instead of providing a refuge from these things.

So Darwin's view, while giving a 'black eye,' so to speak, to theories of chance and special creation, both equally desultory, capricious and lawless, replaced them once for all with law. It indicated the method of operation by which the progressive forms of nature are evolved in stages more and more fit and reasonable. The operation of such a law is no less and no more 'rational,' no less and no more 'fatalistic,' no less and no more 'atheistic' than that of any other law physical or mental. What law — meaning simply what regular method of change — is operative in nature, and what its range, as compared with other such laws — this is entirely a question of fact, to be determined by scientific investigation. And how far the method or law called by Darwin 'natural selection' goes, what its range really is, we are now beginning to see in its varied applications in the sciences of life and mind. It seems to be — unless future investigations set positive limits to its application — a universal principle; for the intelligence itself, in its procedure of tentative experimentation, seems to operate in accordance with it.

Again, it is in connection with this question that we are beginning to see how intelligence may, and does, work within the limits of law, effectively doing its work without violating the universally natural order. The statistical treatment of cases by newer methods[1] shows that events due to intelligence, on the one hand, and those observed to fulfil law on the other hand, fit into the same curves of distribution, if a sufficiently large number of cases of each be taken for treatment. Events involving social and voluntary factors — as crimes such as suicide,[2] the size of families,[3] each for itself depending upon the intelligent and free choice of individuals — when taken in the mass, follow the same laws of number and variation as do purely physical events in which there is no element of conscious determination. If this is so, we need not suppose any essential difference in

[1] See especially K. Pearson, *The Chances of Death*, Vol. I.
[2] See the works of Morselli and Durkheim, on 'Suicide.'
[3] See Pearson, *loc. cit.*

the results in the long run; but may take our choice as between a purely mechanical interpretation of all the cases, or an interpretation of them all as involving a deeper and more immanent principle which works by both methods. In other words, it is not a teleology of the human type, working individually and tentatively against nature, that our philosophy must recognize, but mind in the larger sense of a principle whose mode of operation is in and through the reign of natural law.

One other instance may be cited to show how the evolution theory is serving to bring about a revision of the older philosophical conceptions. The notion of 'cause,' as held by the earlier more dualistic philosophies, has been transformed with the advent of a broader naturalism.

Cause. — An objection to Darwinism, in the early days, was one that held in effect that natural selection left no place for 'freedom' or intelligent initiation, but reduced all the sequences of nature to the level of 'cause and effect' interpreted, as a mechanical principle of the transfer of physical energy. It was held that all movement, the entire dynamic and genetic aspect of nature, became merely a series of compositions and recompositions, of transformations and retransformations, of a certain physical or energetic stuff. 'Matter in motion' was the formula of 'cause and effect.' On further consideration, however, we begin to see how to make articulate our protest against this most superficial generalization. 'Cause' is a broader conception than 'energy.' Only when quantitatively considered are natural sequences exhausted by merely mechanical change. Qualitative differences are as universal and natural as are quantitative identities. There must be a revision of the notion of causation, to allow for the actual growth processes of life and mind, for the new modes of qualitative appearance that the genetic or developmental series of changes show. All vital, mental and social series of changes are of this sort: they are really dynamic, genetic. A psychological effect is not 'equivalent' to its antecedent conditions, considered as its cause, nor in any way identical with them in a quantitative sense. In what sense can we say — and still be intelligible — that a

choice is equivalent or equal in energy to the antecedent motives of the agent? In what intelligible sense can an organic adaptation, upon whose utility the subsequent cause of evolution possibly depends, be said to be a mere transformation, equivalent in energy to the mechanical forces that condition it? We are really dealing here with a different sort of change — with genetic change, with growth and development. We are dealing with qualitative, not quantitative conceptions; with modes of appearance and organization, not with units of energy; and we must recognize the making of new modes of quality in every genetic movement of nature. *Nature achieves novelties;* there is, qualitatively speaking, *more in the effect than there is in the cause.*

This position is forced upon us by the radical acceptance of evolution. Spencer tried to subject the whole evolution movement to the mechanical conception of causation; and he failed most signally. He interpreted all development in terms of successive transformations of energy. Thus life and mind alike were eviscerated of all their richer significance. So soon, however, as we give genetic change a significance as fundamental as mechanical change, we reach a very different result. Every genetic change ushers in a real advance, a progression on the part of nature to a higher mode of reality. *Actually new things — novelties — are daily achieved in life, mind and society.* Mechanical causation, physical energetics — these are the poorest and least interesting facts of nature. They are instrumental conceptions, fruitful in science; but along with the processes which these concepts generalize, go the dynamic, genetic, evolutionary modes of condition and consequent, which are equally actual and, in a comprehensive philosophy, infinitely more far-reaching and significant.[1]

The objection, then, that Darwinism reduces life and mind to physics, is quite beside the mark. On the contrary, the very radicalness of Darwin's conception, in forbidding any compromise with vitalism, accidentalism and all forms of obscurantism, has compelled the recognition of progressive movement, of real

[1] This point of view, developed by the writer under the heading of 'Theory of Genetic Modes' (*Development and Evolution*, Chap. XIX.) is brilliantly and forcefully presented by Professor H. Bergson in his work *Évolution Créatrice.*

evolution, as of the profoundest essence of nature. The reign of physical science and of mechanical law over the scientific and philosophic mind is over now, at the opening of the twentieth century. We have been hypnotized by the term 'energy' long enough.

These illustrations may suffice to show with what stones philosophers are laying the foundations of a new idealism. I may not now develop the matter further, since my topic has its limits in the influence of Darwin. But it is easy to see that with these two conceptions — an immanent principle of change, issuing in modes of reality which are progressively more and more significant for the demands of intelligence and life — the way is open for an interpretation of the world in terms of an organization of which progressive self-integrating experience is the type.

It is sufficient in this place to have shown that, in the working out of such an interpretation, the naturalism of Darwin has been and will be an important factor.

If, in conclusion, a brief statement were called for of the sort of influence Darwin has exercised on modern thought, I should sum it up in somewhat the following terms: Darwin gave the death-blow to uncritical vitalism in biology, to occultism in psychology, and to mysticism and dogmatism in philosophy. Each of these, alike progeny of the obscurantism of dogmatic thought, has in turn yielded before the conception of natural law and order embodied by Darwin in the theory of natural selection. This theory turns out to be not merely a law of biology as such, but a principle of the natural world, which finds appropriate application in all the sciences of life and mind.